OD 9 01
$5.50

$5.50 (NZ 6.95) inc GST

Radio and Communications

incorporating AMATEUR RADIO ACTION and CB ACTION

AUGUST 2001

LATEST REVIEWS

GME's TX4400

t's Australian nd it's great!

Exploring APRS with Kenwood's TM-D700A

COMPARISON

Uniden's UH089/090 CB duo

RON
9 313006

60 channels on the Big Screen

NEW

GME's new TX4400 is not only a 40 Channel UHF CB Transceiver but includes 20 extra programmable Receive Only Channels. All 60 Channels are presented on a super large backlit LCD screen.

So now you can listen to Emergency, Commercial, Security or Government services using frequencies between 465 - 485 MHz.

2 YEAR GME WARRANTY

FEATURES

- User Selectable Priority Channel
- User Selectable Open & Group Scan
- 5 Digit Selcall with Quiet Mode,
- ANI & Alpha Labelling for Selcall
- 2nd Function Key for Simplified Operation
- CTCSS
- Variable Squelch
- Page Transpond Mode
- Die-Cast Aluminium Chassis
- Full DIN Size with Shallow Depth

Designed & Made in Australia

Manufactured and Distributed By:

GME Electrophone

SYDNEY (02) 9844 6666 **MELBOURNE** (03) 9590 9333 **BRISBANE** (07) 3278 6444
ADELAIDE (08) 8234 2633 **PERTH** (08) 9455 5744 **AUCKLAND** (09) 274 0955

For further product information visit our Website: **www.gme.net.au**

Number 73 – August 2001

Radio and Communications

Incorporating AMATEUR RADIO ACTION and CB ACTION

Features

20 **RL Drake** Barry Toseland looks at an historic Amrican radio company and its founder.

26 **Singapore:** Jack Haden finds a treasure chest of bargains in one of Asia's high-profile spots.

28 **End-fed Half Wave antenna.** Stephen R Yates on the antenna commonly known as the Zepp...

42 **Frequency tracking loop antenna.** Antenna info for the apartment dweller! Small need not be inefficient. Phil Harman reports.

55 **11m Antenna basics.** Scott McClements on the basics – part one.

60 **How accurately must we aim a beam?** LB Cebik has the answers.

64 **Make your own inductance meter.** John Saunders' guide for the home handyman...

Reviews

11 **GME's TX4400** CB stalwarts GME have come up with their latest UHF model – reviewed by Neil Duncan.

September issue on sale August 29

16 **HF and UHF all in one** Look closely if you want to pick the difference between Uniden's UH089 and UH090. Neil Duncan.

30 **Exploring APRS with the TM-D700A.** Amateur radio takes on the internet! Neil Duncan.

Regular

14 **Worth Knowing** Neil Duncan, VK3ND, lon the latest 'happenings'...

19 **Retro – Uniden's UBC760XLT Scanner** Neil Duncan, VK3ND, looks back on this "oldie, but still a goodie"

22 **Baudwalk** Tom Sundstrom, W2XQ, with his regular look at what's on the Internet.

32 **The 27MHz Dxer** Jack Haden, VK2GJH, tells you what you've been missing by way of DX on the 11m band.

36 **Shortwave** John Batty reports on shortwave listening "with a difference"...

38 **Investigate the unusual** Russell Bryant suggests there's more than one way to keep track of what's going on...

46 **Mods, Fixes and Updates** Greg Towell's column this issue looks at an assortment of worthwhile tricks.

51 **Circuits Galore** From Syncro's Jos Hahn comes the latest instalment of these popular pages.

66 **Shortwave** If it's where and when to listen for shortwave stations you're after, Craig Seager provides enough info to keep you going until the next issue.

70 **Flightwatch** United Flight 232 and its heroic crew – Bob Bell has a story of survival.

74 **DX Band and IOTA** is of course where you will find the latest HF DX information courtesy of well-known DXer Jim Smith, VK6NS.

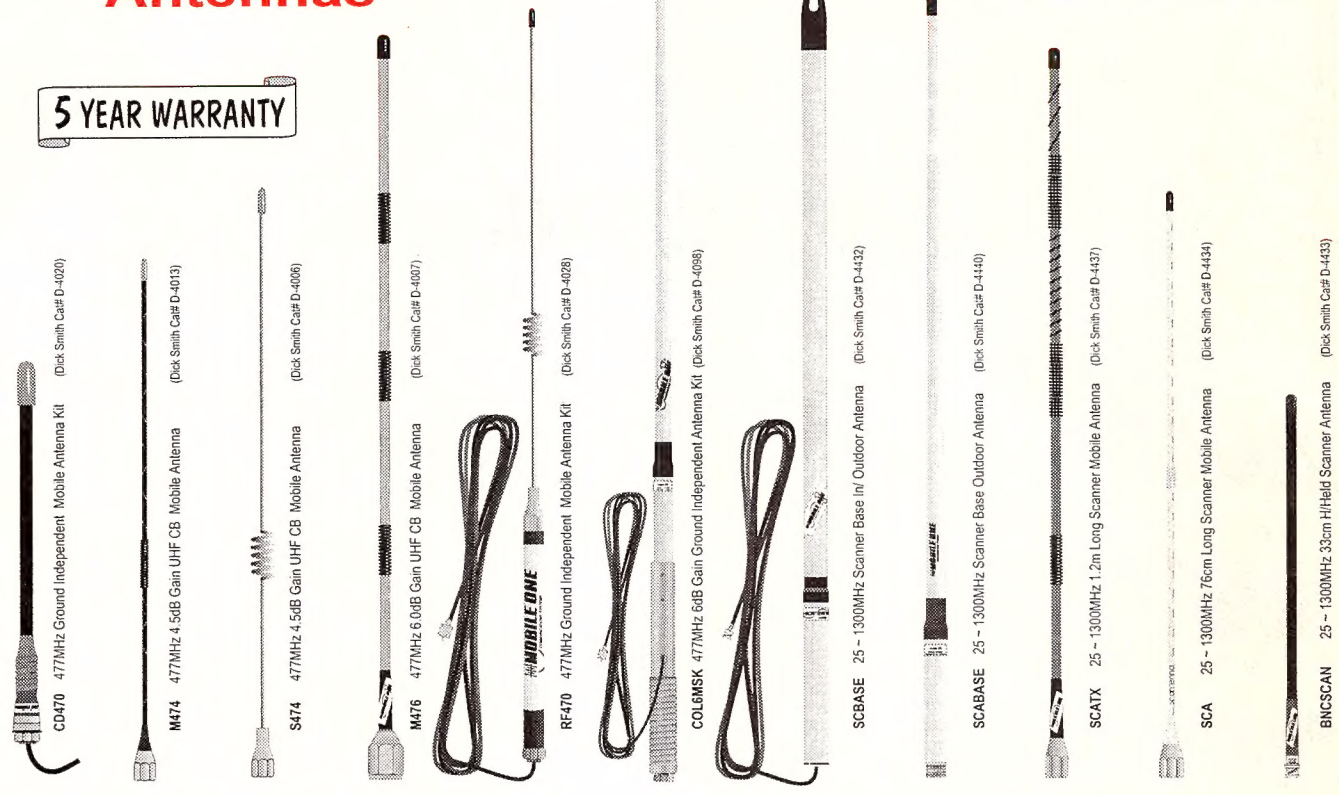
78 **DX Propagation** charts tell you what sort of a DX month you're likely to have.

80 **Classifieds** All the goodies are listed on these pages – get in quick before they're sold.

82 **Retro – Yaesu's FT 747 transceiver.** Neil Duncan evaluates what it is worth today.

477 MHz UHF CB Antennas

5 YEAR WARRANTY


CD470 477MHz Ground Independent Mobile Antenna Kit (Dick Smith Cat# D-4020)
M474 477MHz 4.5dB Gain UHF CB Mobile Antenna (Dick Smith Cat# D-4013)
S474 477MHz 4.5dB Gain UHF CB Mobile Antenna (Dick Smith Cat# D-4006)
M476 477MHz 6.0dB Gain UHF CB Mobile Antenna (Dick Smith Cat# D-4007)
MOBILE ONE
RF470 477MHz Ground Independent Mobile Antenna Kit (Dick Smith Cat# D-4028)
COL6MSK 477MHz 6dB Gain Ground Independent Antenna Kit (Dick Smith Cat# D-4098)
SCBASE 25 ~ 1300MHz Scanner Base In/ Outdoor Antenna (Dick Smith Cat# D-4432)
SCABASE 25 ~ 1300MHz Scanner Base Outdoor Antenna (Dick Smith Cat# D-4440)
SCATX 25 ~ 1300MHz 1.2m Long Scanner Mobile Antenna (Dick Smith Cat# D-4437)
SCA 25 ~ 1300MHz 76cm Long Scanner Mobile Antenna (Dick Smith Cat# D-4434)
BNCSCAN 25 ~ 1300MHz 33cm H/Held Scanner Antenna (Dick Smith Cat# D-4433)

Mobile One UHF antennas are available in all UHF frequencies.

High Performance Scanner Antennas

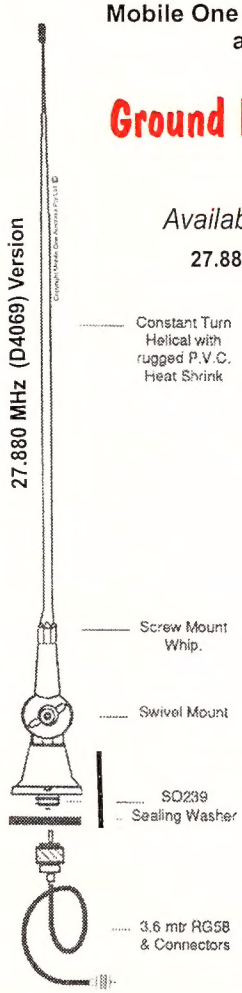
Mobile One Scanner Antennas are guaranteed high performance

Ground Independent Marine Antennas

HF, VHF & AM/FM

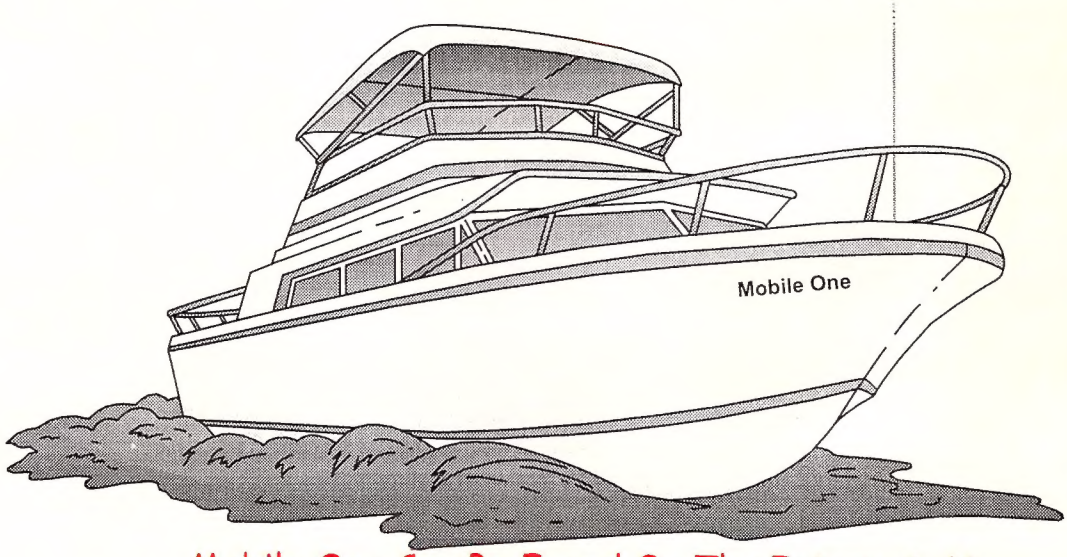
Available From Dick Smith Electronics Stores

27.880 MHz (D4069) **156 ~ 162 MHz (D4014)**


27.880 MHz (D4069) Version
Constant Turn Helical with rugged P.V.C. Heat Shrink
Screw Mount Whip.
Swivel Mount
SO239 Sealing Washer
3.6 mtr RG58 & Connectors

Features

1. Ground Independent Mounting.
2. Robust Swivel Deck Mount.
3. Antenna Removable From Mount.
4. Pretuned For Fibreglass & Wood Boats.
5. Supplied With 3.6 mtr Cable & Connector.
6. Available For HF, VHF and AM/FM Radios.



Mobile One Can Be Found On The Internet At

www.mobileone.com.au **antenna@mobileone.com.au**

Mobile One Australia Pty Ltd Po Box 123 Camden NSW 2570 Ph: 02-46556677 Fax: 02-46556600

MOBILE ONE COMMUNICATIONS SYSTEMS

HANDHELD RADIO ANTENNAS

Available with BNC, TNC, PL259 or N Type Connectors

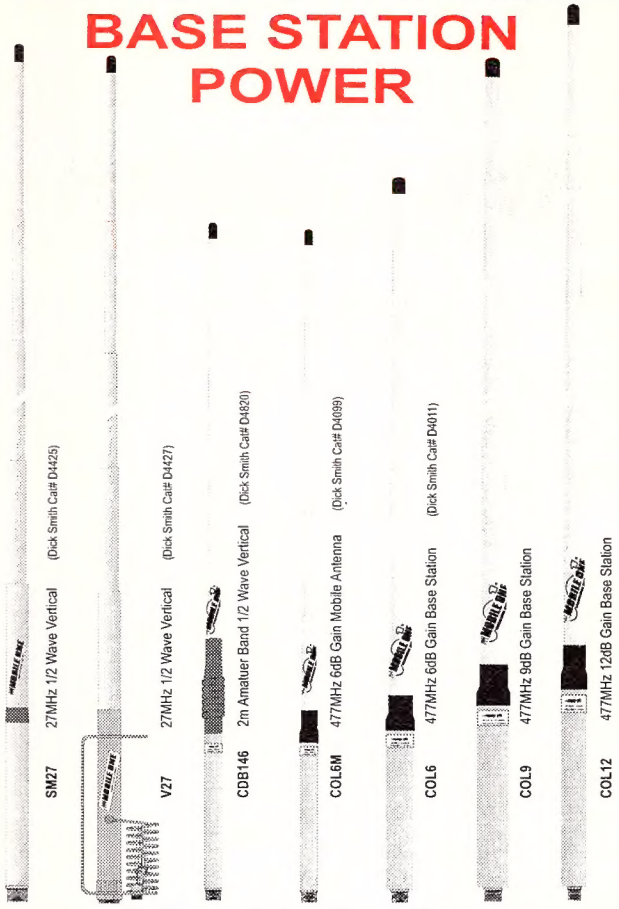
26 ~ 520MHz Specify Frequency

5 YEAR WARRANTY

BNCS Approx 85mm long unity gain 400 ~ 520MHz
BNCRD Approx 170mm long unity gain 44 ~ 85MHz
BNCFW Approx 170mm long 1/4 wave unity gain 300 ~ 800MHz
BNCMD Approx 190mm long 1/4 wave unity gain 60 ~ 220MHz
BNCHW Approx 250mm long 1/2 wave 2.5 dB gain 430 ~ 520MHz
BNCRD27 Approx 250mm long 1/4 wave unity gain 26 ~ 800MHz

Mobile One handheld antennas are available in BNC, TNC, or N Type Connectors

BASE STATION POWER


SM27 27MHz 1/2 Wave Vertical (Dick Smith Cat# D4425)
V27 27MHz 1/2 Wave Vertical (Dick Smith Cat# D4427)
CDB146 2m Amateur Band 1/2 Wave Vertical (Dick Smith Cat# D4820)
COL6M 477MHz 6dB Gain Mobile Antenna (Dick Smith Cat# D4099)
COL6 477MHz 6dB Gain Base Station (Dick Smith Cat# D4011)
COL9 477MHz 9dB Gain Base Station
COL12 477MHz 12dB Gain Base Station

Mobile One UHF Base and Mobile Antennas are made in Australia with Australian Parts

HOW TO SPOT A MOBILE ONE ANTENNA

The best Australian Fibreglass

TOTALLY AUSTRALIAN MADE

Quality tough heatshrink

5 YEAR WARRANTY

Mobile One Sticker

Finest Australian Aluminium

Familiar Mobile One Stand

Hard Working Australian

WHY?

Buy an antenna from anyone else when only Mobile One gives you the quality, value & support that you deserve.
Mobile One only make antennas and that is why we do it so well.
So if you have bought an antenna recently ask yourself this question will I get support if I need it?
Chances are if it's not a Mobile One you won't

SCOOP PURCHASE!

All-mode operation on the HF, 6m, 2m, and 70cm bands with full satellite capability...

Yaesu FT-847 'Earth Station'

Ready for action on SSB, CW, AM, FM and digital modes, the FT-847's compact size makes it ideal for a variety of portable/mobile applications as well as for serious base station operation. You get a solid 100W output on the HF and 6m bands, 50W output on both 2m and 70cm, dual fan cooling and a rugged diecast chassis. Plus, the ultra-quiet HEMT receive pre-amp on 2m and 70cm contributes to the FT-847's amazing sensitivity figures. Advanced Digital Signal Processing (DSP) circuitry enhances received signal/noise ratio for easier copy of signals under marginal conditions through the use of 16 selectable noise reduction algorithms, while the Bandpass and Auto-notch filters aid the IF based Shift and Noise Blanker circuits in reducing interference on crowded bands.

The FT-847 is ready for satellite operation, with crossband full duplex operation, normal and inverted VFO tracking of the satellite uplink/downlink, as well as 12 special satellite memories with alpha-numeric tags. Also provided is a low-noise Direct Digital Synthesiser (DDS) that provides tuning steps as small as 0.1Hz, plus there's an adjustable DSP bandpass filter as narrow as 25Hz for exceptional weak-signal CW performance. You can also install optional Collins® mechanical filters in both the transmit and receive chain for enhanced SSB operation, as well as a 500Hz Collins® filter in the receiver side for CW. An effective speech processor with adjustable frequency shift voice tailoring is also provided to add punch to your SSB transmissions. The FT-847 is ready for data modes, with a rear panel Data In/Out socket and a packet socket for 1200/9600 baud VHF/UHF operation. Other features include extended receive operation (36-76, 108-174, and 420-512MHz), a high-speed computer control interface, 10-key keypad for band/frequency entry, and a Shuttle-Jog tuning ring for fast QSY. Also included are encode/decode CTCSS and DCS operation, selectable channelised steps for FM operation, FM narrow/wide modes for 29MHz use, and a large LCD screen with adjustable backlighting.

Each transceiver is supplied with a hand-mic, DC power lead and a comprehensive instruction manual. Call us for a copy of Yaesu's 6 page colour brochure to learn more about this incredible value 'Earth Station' transceiver.

D 3425

2 Year Warranty

YAESU **$2995**

SCOOP PURCHASE!

SAVE $441

Offer expires 30/9/01

DICK SMITH ELECTRONICS

That's where you go!

2935 DPS 4COL

DON'T MISS THE ACTION!

YAESU VX-IR 2m/70cm micro handheld

One of the worlds smallest dualband handhelds, just 47 x 81 x 25mm (WHD) including a high capacity 700mA/H Lithium-ion battery! The VX-IR covers both 2m and 70cm amateur bands, plus offers AM/FM and TV sound reception, 2 hour fast charging as standard, simple settings and a large LCD screen.

Features:

- Tx: 144-148, 430-450MHz. • Rx: 0.5-1.7MHz, 76-300MHz, 300-580MHz, 580-999MHz (cellular locked out).
- Output: 2m/70cm 0.5W (at 3.6V), 1.0W with external DC. • 291 memories, most with Alpha naming.
- AM, FM (n), and FM (w) reception modes. • CTCSS encode/decode.
- 31 smart search memories • Tone search for CTCSS and DCS.
- Includes FNB-52LI 3.6V 700mA/H Lithium-ion battery, regulated AC adaptor/charger, antenna and belt-clip.

D 3665

SAVE $37

$348

2 Year Warranty

YAESU FT-1500M Heavy Duty 2m FM Mobile

Another Yaesu transceiver breakthrough, the new FT-1500M blends an efficient transmitter with an almost bullet-proof receiver front end, and is packaged in rugged die-cast aluminium casing. You get powerful 50W RF output, direct keypad frequency entry, Alpha-numeric memory labelling, easy data interfacing, and much, much more.

- Transceiver coverage of the 2m Amateur band (144-148MHz), with extended receiver coverage of the 137-174MHz range.
- 50W RF output, with selectable 5, 10, or 25W lower power levels. The efficient PA stage only draws 8A at 13.8V DC for full RF power output.
- High-performance receiver front-end circuitry using Yaesu's renowned Advanced Track Tuning (ATT) tracking bandpass filter design.
- Includes MH-48B6J DTMF microphone for direct keypad frequency entry, plus convenient Menus with 35 'set and forget' functions.
- 149 memories are provided, with 130 regular memories, 9 pairs of sub-band memories, and an instant recall 'Home' memory.
- Additional features: Supply Voltage Display, transmit Time-Out Timer, Auto Power Off, and S-meter RF Squelch.

D 3638

2 Year Warranty

$399

All Yaesu products listed are priced in Australian dollars, and are not stocked in Dick Smith Electronics stores outside Australia. Check our web site www.dse.com.au for further ordering information.

PHONE FAX AND MAIL ORDERS

DICK SMITH ELECTRONICS direct link

PHONE: Within Australia: 1300 366 644 (Local call charge)

FAX: (02) 9642 9155 within Australia and (+612) 9642 9155 from outside Australia

Visit our web site at http://www.dse.com.au

MAIL: DICK SMITH ELCTRONICS, Direct Link, Reply Paid 500, PO Box 500, Regents Park DC NSW 2143 (No stamp required)

Excludes packaging and postage. All major credit cards accepted. 14 Day Money Back Guaranteed if NOT completely satisfied. (Software, books, contracted phones, ADMS packages excluded)

DICK SMITH ELECTRONICS

That's where you go!

Yaesu transceivers and accessories stocked in selected Australian stores only. Other Australian stores can place orders on a deposit-paid basis. Offers expire 30/9/2001. All prices shown are in Australian dollars and are inclusive of GST.

2935 DPS 4COL

KYLE communications

YOU WILL NEVER BE OUT OF CONTACT WHEN YOU DEAL WITH US!

RFDS HF RADIO

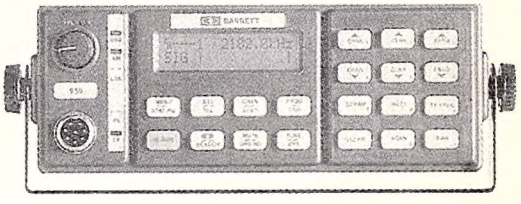
CODAN ● BARRETT ● QMAC

CODAN NGT with auto tune antenna . . . . . **POA**

BARRETT SB950 (pictured) with auto tune antenna . **POA**

QMAC HF90 with auto tune antenna . . . . . **POA**

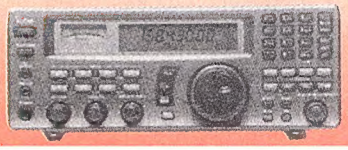
ALL UNITS COME WITH SELCALL AND TELCALL



ICOM *when only the best will do*

RECEIVERS
IC-R8500
IC-R75
IC-PCR1000
IC-R10
ICR2

UHF CB
IC-40S
IC-F2010

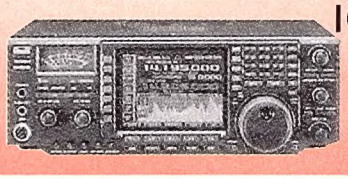


IC-R8500

AIR BAND
IC-A4
IC-A4C
IC-A22
IC-A22S
IC-A200
IC-A110

MARINE BAND
IC-M1
IC-M45
IC-M59

AMATEUR BAND
IC-756PRO
IC-746
IC-706Mk2G
IC-718
IC-2800H
IC-207H
IC-T8A
IC-T81
IC-Q7



IC-756PRO

WE HIRE

HF RADIOS ● SATELLITE TELEPHONES ● OPTUS MOBILE SAT ● INMARSAT ● VODAPHONE/GLOBALSTAR

ONLY BUY ICOM FROM AUTHORISED ICOM DEALERS

Call or write to MARK for more info: 668 Lutwyche Rd, Lutwyche, Brisbane 4030

Ph 07 3857 4400 Fax 07 3857 7825 Mobile 0408 72 4272

Website: www.kyle.com.au Email: mark@kyle.com.au

Editorial comments...

This issue is pretty heavy on antenna related articles from 11m basics through to a J Pole and Loop antenna, also a tad light on amateur HF equipment reviews – due simply to the fact that there is not much new to report!

We are hopeful that we'll be able to bring you a full review on the Yaesu FT-1000 Mk V in the next (September) issue. It was not available in time for inclusion this month but with a little bit of luck by next issue we should have spent some time with it. We know many readers are keen to hear a full report on what appears to be a "top shelf" transceiver so please be patient.

Either way, however, in this issue there is a wealth of reading covering a wide variety of topics.

We'll maybe cop some criticism about going "back to basics" on 11m – however, it has become obvious from a number of letters and email that there continues to be a strong interest in the CB HF field and many newcomers really do not have the basic knowledge on which to build.

The article in this issue was supplied by American Scott McClements and is the first of several that will provide some technical insight as to what makes it all work, other than just turning on the power. While specifically aimed at 11m operators, the report can also be usefully read by amateurs who may also learn, or relearn, something long forgotten.

The article from "LB" Cebik ponders the question of just "how accurately a directional antenna must be pointed for best results." The answers may well surprise you. If you're a DXer, this should be must reading.

Phil Harman, one of our two regular "antenna men", has provided us with the "Frequency Tracking Loop Antenna," specifically aimed at operators who suffer from space limitations for their antennas.

He doesn't claim that its performance will match that of a five element monoband Yagi but he does claim that it can provide surprisingly good performance overall – it's also an antenna that you can build at very little expense and, as they say, "will provide everyone with hours of fun."

Another worthwhile little project is that on the J-Pole antenna contributed by American Stephen R. Yates, AA5TB.

Scanfans will have to wait for the next issue when Russell Bryant has an in-depth look at rubber duckies, telescopic and discone antennas in respect to what's what and what's best under varying conditions.

There are also three reviews on UHF CB rigs with one from GME and two from Uniden – including the first Australian release of a combined UHF/AM rig.

The UH-099 is, according to dealers, taking off in a big way.

One question, however, why is it AM rather than SSB? Uniden is to be congratulated on their technical ingenuity but I wonder why the company didn't go the whole hog – maybe leaving room for an update to SSB at a later date?

GME's new TX4400 continues its line of top quality, Australian-built UHF CBs and introduces "factory programming" for a number of additional "receive only" channels.

Smart move this – have your local police, fire, ambulance frequencies, etc programmed into the rig and ready for listening without any further fiddling.

Of course there's a whole lot more than simply the above and we think that's it's sufficiently varied to provide plenty of interesting reading for a wide variety of readers – have fun...

Finally, just to keep you posted on how R&C is doing since its change of ownership back in January, the answer is extremely well thanks.

Sales have continued to increase each month as also has advertising content – both of which are essential to maintain the magazine in a viable situation. Our sincere thanks to our readers and advertisers – obviously we wouldn't be here if it wasn't because of you.

Len Shaw, VK3ALS

The DX Magazine
Since 1989

THE DX MAGAZINE is the only publication of its kind. Published bi-monthly and covering all aspects of the world of DXing. Each issue includes DXpedition stories, DXCC news and events, GoList QSL routes and addresses, product reviews, technical articles of interest to DXers, and much more. The famous **100 MOST WANTED** survey results appear in the January/February issue each year.

DX TIPS FOR BIG GUNS & LITTLE PISTOLS
QRZ DX
WEEKLY DX NEWS BULLETIN
Since 1979

QRZ DX - one of the longest running DX newsletters in the world. 50 weeks each year, you get the latest DX News, information on current and upcoming DXpedition's, QSL routes and more. Available by regular mail or E-Mail (PDF file), you can rely on ***QRZ DX*** to keep you up-to-date on DX happenings around the world.

For more information
Call - FAX or Write

Carl Smith - N4AA

DX Publishing, Inc.
PO Box DX
Leicester, NC 28748-0249 USA
828-683-0709
Toll-Free - 877-397-8254
Email: N4AA@dxpub.com
WEB: http://www.dxpub.com

Radio and Communications
Incorporating AMATEUR RADIO ACTION and CB ACTION

EDITOR:
Len Shaw
PRODUCTION/GRAPHICS:
Viv Brumby

CONTACTS
Editorial & Advertising
PO Box 887, Seymour, VIC 3661
Ph: (03) 5799 2995 Fax: (03) 5799 2979
email: lenshaw@eck.net.au

Radio & Communications is published by
Cinch Pty Ltd (Publishing) – ABN 58 007 038 904
PO Box 1010, Caulfield North, VIC 3161
Publisher: C Lambden
Associate Publisher: J Haden

Printed by: Hannanprint Victoria, 504 Princes Highway, Noble Park VIC 3174. Distributed by: NDD Ltd

Material published by RADIO & COMMUNICATIONS is copyright and may not be reproduced in full or in part without the written permission of the publisher. Freelance contributions are welcome, and while all care will be taken, Radio & Communications does not accept responsibility for damage or loss of material submitted.

Opinions expressed in Radio & Communications are not necessarily those of Cinch Pty Ltd (Publishing) or its staff.

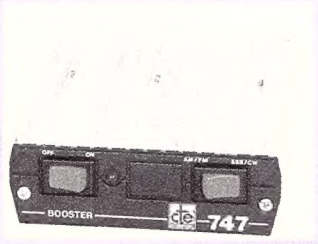
SYNCRO

AUSTRALIA COMMUNICATIONS SPECIALISTS

MB+4 – Zetagi Desk Top power mic $99

M 97 – Zetagi handheld power mic $110

Master 2002 – Simultaneous connection to 3 transceiver. $345



CTE C747 120 watt $125

CTE C737 60 watt $95

26-30 MHz SWR meters
SWR 2 swr meter $15

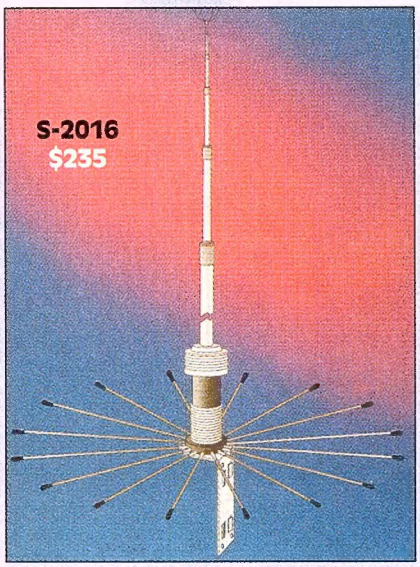
SWR 1 swr/power meter $18

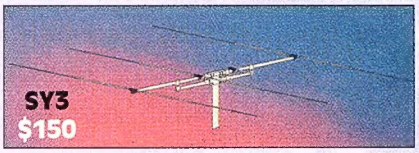
DP202 – 26-30 MHz criss cross meter with direct reading $65

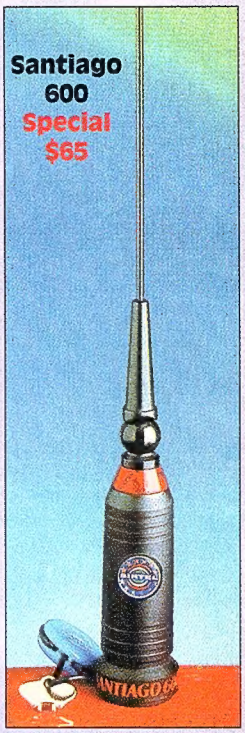
F15 Handheld frequency counter 8 digit LED 6MHz – 1.3 GHz **$285**

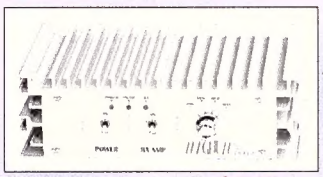
GALAXY SATURN
10 Metre Base Station $845

DELTA FORCE
10 metre Mobile AM/FM/SSB/CW 30W Turbo Echo and AMT

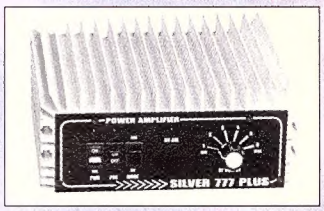




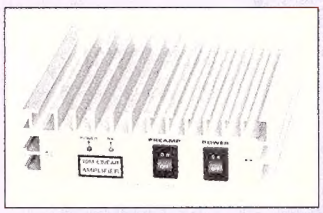




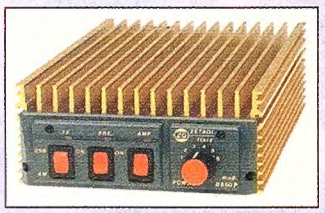
TX2250-1446 $335
TX2250-2879LD $398



Silver 777 $335

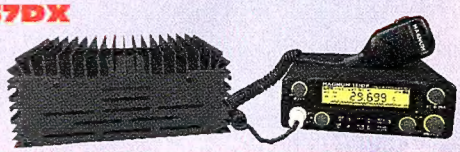


TX125PN $198



B550P $475

Magnum 357DX
with separate RF deck 10 Metre 150W output plus $745



Mail orders, credit cards, cheques & COD's. Sales, service & shipping nation wide.

Goods available direct from us or through appointed dealers.

Sole importers or Dragon, Magnum Delta Force, Palomar, Zetagi, Sirtel, Sirio, Sadelta, Dirland

197 FALLS ROAD LESMURDIE WESTERN AUSTRALIA 6076
Tel: +61 (08) 9291 9982 Fax: +61 (08) 9291 9984 Mobile: +61 0404 091 123
Email: hahn@syncroelec.com.au Website: http://www.syncroelec.com.au

Neil Duncan reviews the latest from GME

THE TX4400 UHF CB

GME has been in the game for a long time with both HF and UHF CB models and the TX4400 model under review is the latest from this company

Taking on overseas radio manufacturers at their own game is real David and Goliath stuff. However GME Electrophone, an all Australian manufacturer is not only doing this with flair and style, but they are also about to celebrate the release of yet another new product - the TX4400, an all new 477MHz UHF CB transceiver. R&C is happy to be allowed the first review of this device.

Now, to me, CB radios come in two forms. The first is the 'planned obsolescence' sort, designed for a limited life. They are just waiting for the first sign of rain, puff of dust or excess speed over a speed hump to come along and kill them off.

The second kind is designed for the serious user, whose demands for quality or perhaps their needs for extra reliability is a tad higher than that. But then, there is a second concept to be considered when selecting a CB unit too.

27 MHZ AM OR FOR UHF CB?

The advantages of 27 MHz for some CBers over UHF are obvious - equally so, however, in the opposite direction. Installation of the unit is pretty much the same for both modes, however, potentially longer communication distances are available on the HF service than on UHF - probably a plus if you are travelling outback. For "convoy type" travelling, use around the farm or work area, UHF is the best bet as, while it lacks the HF long distance communication ability it can still cover a lot of ground via the national-wide repeater stations.

GME has been in the game for a long time with both HF and UHF models and the TX4400 model under review is the latest from this company.

The TX4400 is a full sized UHF unit just bristling with features and bursting at the seams with quality. It replaces GME's well known TX4200 and carries on a well established tradition of quality with performance.

Unpacking the TX4400 from its modest box reveals quite a small radio with a large LCD display. Your chosen DC power plugs into the connector on the back panel while the antenna, and the extension speaker (if you need one), also plug into sockets on the rear panel. The large speaker at the front of the set did all that I wanted, giving plenty of audio - even in a fairly high noise environment.

At first the microphone arrangement seemed a little unusual to me, but, I am not overly familiar with GME's products. The hole on the front panel looked like a mistake for a while there. Maybe a button had broken off and left a hole? But no, the modular connector on the microphone neatly plugs into a recessed socket behind that hole and the rubber boot on the microphone lead kind of squishes in after it. On reflection, this is a great arrangement, both for electrical reason and for reasons of keeping the great outdoors from entering the radio.

Dust, moisture and so on.

Having switched the st on, you are greeted with a large display with a huge channel number. Straight away, I plugged my discone antenna into the antenna socket and tried the unit out in its most basic modes of operation. The TX4400 is a 40 channel

set with one priority channel, a very accurate five watts of RF output in the FM mode and has one more lovely feature - it allows an additional 20 receive-only, factory programmed channels between 465 and 485MHz to be included.

Some really useful channels were kindly pre-programmed into the review unit by the good folks at GME.

The most interesting of the 'essential service' channels in my area (the police as far as I'm concerned) made for excellent entertainment while I was trying to do some work in the radio shack!

Be sure to choose your frequencies well when ordering the set.

Other features on the TX4400 include:

- programmed channel scanning
- flexible duplex function for repeater access
- Selcall with "quiet" mode
- CTCSS with "silent" mode
- 10 Selcall identification memories
- Automatic Number Identification
- paging feature
- overvoltage protection.

Mounting the unit into a vehicle is made simple by the design of an adjustable 'gimbal mounting ' system which allows for flat or tilted mounting, In addition, the unit conforms to a 'DIN' measurement system, so that the radio will neatly fit into the aperture in the centre console of many vehicles. The built in front facing speaker is the ideal arrangement for such installations.

As noted, the most striking feature of TX4400 is the large backlit display that clearly indicates the selected channel, and also has a digit devoted to signal strength.

There are also smaller displays of such things as 'busy', scan mode and channel memory number. There are also five clearly illuminated push buttons under the display, which all have a second function. These a buttons a little hard to read in a hurry but they are very clearly marked and well lit up. After a short time you tend to memorise them.

On receive, the TX4400 pulled in signals from repeaters from tens of kilometres away and from simplex stations that were passing within about 15 km of my area, proving itself to be easily as good as the reference UHF set that I have in the shack - a radio which is known to be a star performer. The sensitivity on the CB channels of the TX4400 is a little higher than on the pre-programmed channels, but only by a whisker and it is great on both.

Immunity from adjacent channels interferences was excellent.

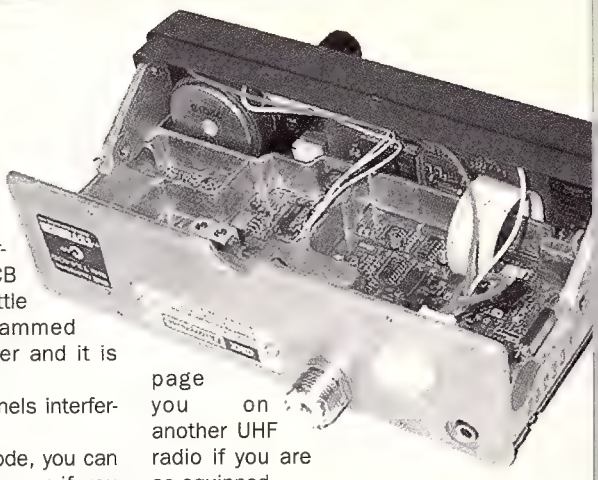
By putting the set in scan mode, you can inspect all 40 channels in turn, or if you want, a reduced number of them. The scanning is quick. very nicely programmed and can be adapted to a number of 'modes' of operation.

Let me assure you though, the excellent 34 page manual will be needed here.

On transmit, both in normal 'simplex' mode and in the repeater or duplex modes, the TX4400 proved to be excellent, with a clear and crisp audio and with no problems of any sort that I could detect. Duplex operation is user-programmable and will obviously depend on what repeater channels are used in your areas of travel.

Other features of the TX4400 are clearly derivatives of commercial radio functions but should prove useful for a number of reasons. 'Selcall' is a selective calling system that allows your set to operate 'like a telephone'. Each set has a unique number and if you invoke the 'quiet' mode, unless an incoming signal also has that number built into it, your set remains quiet. The unique number used by your set is briefly displayed when you first switch the set on. When you transmit, you can program up to 10 selcall 'CALL TO' memories, all ready to selectively call other similarly equipped units. A nice feature is associated with this enabled by pressing the little button on the microphone. Four of the five illuminate buttons become selective calling buttons, selecting pre-defined codes you have program there when you push the respective button.

You can program the set to make an audible beep if an incoming signal has your number on it, and you can even get your radio to



page you on another UHF radio if you are so equipped.

SELCALL AND CTCSS

Each 'Selcall' memories can also be programmed with a name so that you can 'see' on the screen just who you are calling.

Now, if that is not enough, there is also a fully adaptable CTCSS system built in.

With this, you select a tone from the 50 available tones and expect the incoming signal to have that (sub-audible) tone on it before you can hear it. Likewise, when enabled, your outgoing signal will have that tone 'invisibly' present on it whenever you transmit. This is useful for group conversations on a busy channel and for accessing certain repeaters. Be careful with this system though, you can clobber other people using the channel unwittingly because they haven't been transmitted with one of these tones and thus can't be heard in your set.

SUMMARY

The TX4400 is a modern, well built Australian-made UHF FM CB transceiver. The impressive number of functions that it arrives with are clearly explained in the written manual, making his rig suitable for a wide range of users.

The unit comes with a two-year manufacturer's warranty from GME Electrophone. A range of accessories is available from GME. It is worth a visit to their website (www.gme.net.au) to see what is available.

Extension speakers, replacement microphones, AC/DC supplies, voltage reducers and so on. R&C congratulates GME on their latest product and thanks them for the kind loan of the review unit.

GENERAL

Compliance:
- Compliant with AS/NZS 4365 for radio communications equipment in the UHF citizen band and personal radio service.

Frequency Range:
- 476.425 MHz - 477.400 MHz.
- Number of Channels: 40 (+ 20 receive only).

Frequency Range (receive only):
- 465 MHz - 485 MHz.

Channel Spacing: 25 kHz.

Operating Mode:
- Simplex or half duplex with repeater talk-around.

Scanning Speed:
- 100 ms per channel (10 channels per second).

Antenna Impedance:
- 50 Ohms nominal.

Nominal Battery Voltage:
- 12 VDC.
- Negative Earth.

Operating Voltage Range:
- 10 to 16VDC. Current consumption: typically
- 1.4 Amps.

Overvoltage Protection:
- 30 VDC maximum - At 18 VDC the RF power is reduced and the channel display flashes "Hi DC" on receive.

Reverse Voltage Protection:
- Diode Crowbar.

Overcurrent protection:
- In-line 3 Amp fuse.

Operating Temperature:
- -10 C to 60 C.

TRANSMITTER

RF Output: 5 watts.

Spurious Emission: < -70 dB.

Frequency Error: <± 5 PPM.

Modulation: FM.

Maximum Deviation: < ± 5kHz.

Transmit Frequency Response:
- ± 6dBper octave 300 Hz to 3 kHz.

Current Consumption: Typically 1.4 Amps.

RECEIVER

Bandwidth: <5 MHz.

Intermediate Frequencies:
- 21.4MHz and 455 kHz.

Sensitivity:
- 123 dBm for 12 dB SINAD unweighted. Sensitivity of Receive-only

Channels:
- -107 dBm for 12 dB SINAD.

Selectivity:
- -6dB ± 7.5 kHz, -70 dB ± 25 kHz.

Intermodulation Immunity:
- -76 dB.

Blocking Immunity: >100 dB.

Spurious Response Immunity:
- -70 dB.

Audio Output Power:
- 3 watts average into 4 Ohms.

Audio Signal to Noise:
- > 45 dB unweighted.

Current Consumption:
- 210 mA muted, 600 mA full volume.

MECHANICAL

Dimensions:
- 171 mm (W) x 95mm (D) x 52mm (H)

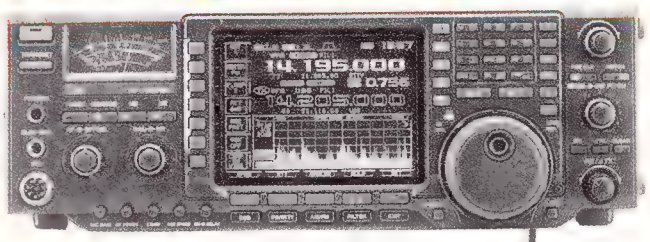
Weight: 626 grams

STRICTLY HAM PTY LTD

IC-746

- Your best way to get onto HF plus six and two metres
- Multi-function high resolution display
- Direct frequency entry
- Fabled Icom *work the world* performance
- Great in the shack or can go portable

IC-756 PRO



- Icom's new HF+50MHz digital performance king! Try to see why...
- Fantastic colour multi function screen

TH-D7A h/held

- Dual bander for effortless two metres and 70cm
- *BUILT-IN* Packet Radio TNC! Ideal for use with APRS
- 200 fully alphanumeric memory channels
- Full 6W out from 13.8VDC
- Supplied with NiCd battery and charger
- Nothing else even comes close!

TS-50S

- Solid mobile or base HF rig
- Fabulous Kenwood audio
- Matching optional auto ATU

IC-207H

- Affordable dual-bander with no-nonsense Icom quality
- Can be remote-controlled

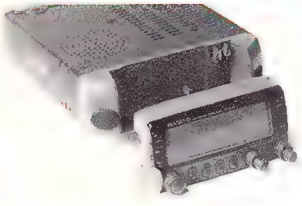
IC-R3 h/held

- Meet Icom's fantastic new scanner!
- Huge TFT colour multi function TV screen
- Has high tech Lithium-Ion battery technology
- 450 memory channels
- Covers 0.5 to 2450MHz
- Joystick

IC-718

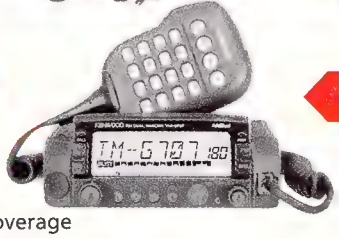
- Icom's great new HF price leader
- All bands 160-10 metres plus gen cov receive
- 100 effortless watts output on all bands!

TM-V7A



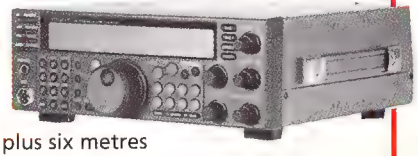
- Stylish Kenwood dual-band 2m & 70cm
- Plug-in 9600 baud TNC convenience
- Can be remote-controlled from the boot

TM-G707A



- Kenwood's latest dual-bander
- Covers two metres and 70cm
- Outstanding Kenwood audio
- Extended receive frequency coverage
- A Kenwood remote-control masterpiece

TS-570S



- Frequency range: 1.8-54MHz, all HF bands plus six metres
- Great heterodyne zapper
- Industry-best DSP *standard* • Improved model better than ever

14 CHURCH ST BAYSWATER VIC 3153

Phone (03) 9729 7656 Fax (03) 9729 7422 • E-mail: sales@strictlyham.com.au

www.strictlyham.com.au

Worth Knowing

Neil Duncan, VK3ND, brings you up to date on "happenings" from here and there ...

BAND FAR FROM DEAD

Many may have given away 6m DXing for the winter, but the band has been far from dead. Eyebrows were raised on the east coast when it was learnt that VK6JQ (PH-12) worked into KL7, VE7 and W7 from 0500z onwards on June 4. Not to be outdone VK6JQ and VK6AO/P (PH-12) worked into Europe on June 11 from 0955-1042z, hearing and working SP6GWB, DJ5RE, ON9BGP, G4FUF, DL8YHR, ON4AOI and DL6BF. (From Jack Haden VK2GJH).

GOING ON A DXPEDITION?

A few days on a lush island paradise, playing amateur radio all day would not be a bad idea, I should think. But what kind of gear do the various DXpeditions take with them?

Seems that a survey in the US came up with the result that Yaesu dominates this field. Of the 350 respondents in the survey, 41% went for Yaesu, with the FT1000s heading the list. Kenwood was second with 29%, ICOM with 21% and Ten Tec 6%.

For selecting a suitable antenna, take note of the fact that 52% respondents used Yagis, 16% verticals, 15% dipoles, 9% quads and 4% used 'other' including loops and inverted vees.

THE ULTIMATE RIG

At US$14,500, the 'Milspec 1030E-DSP' rig from the US company Signal One might be just the trick for you. It is a total rebuild of the Icom IC-781 and includes the IC756-PRO DSP-IF System.

You have two choices. Buy one, or send off your old IC-781 and they will rebuild it - at a price. 'Upon receipt of your IC-781, we will ship you one NEW Signal One Milspec 1030 CI for US$4950', their Website says.

It features a rebuild of that wonderful scope, a larger screen, and faster display updating. Integrated into the unit is a full Sony Intel Pentium II System (333MHz) with full-size USB keyboard, 256kB cache, 6.4GB hard drive, 64MB RAM, sound, modem and USB connectors - and it runs Windows 98.

Will your current radio do that?

With full HF plus 50 to 54 MHz RX/TX operation for the radio amateur, it looks quite nice doesn't it?

RADIO-DIRECTION-FINDING JAUNT OVERSEAS

Now if DXpeditions are not quite challenging enough for you, what about running after a 'radio fox' on a radio-direction-finding jaunt overseas? The '4th IARU Region 3 ARDF Championships' will be held in Ulan Bator, Mongolia, August 23-28.

There should be plenty of places to hide the fox, if I know my Mongolian geography. Mountains everywhere.

If anyone would like more information, contact jt1kaa@mongol.net or peek at the Website http://www.homingin.com

SPACE SHUTTLE NEWS

From the ARRL comes the information that the next ISS Commander will be Frank Culbertson, who is KD5OPQ. Joining him on the International Space Station as part of the Expedition 3 crew will be cosmonauts Mikhail Turin and Vladimir Dezhurov, who also have amateur radio licenses.

Shuttle Mission STS-105, scheduled to fly in August, will ferry Commander Culbertson to the station.

Again, a priority of amateur radio operation on the shuttle is in contacting school groups, but an increasing number of individual contacts are being made.

Apparently, unattended packet stations trying to contact the International Space Station are causing havoc to a number of orbiting amateur radio satellites.

While the automatic stations may eventually snag the ISS, the batteries on the satellites are being drained significantly when this is happening.

The plea is being sent out to organise those unattended TNCs so that they only transmit when the receiver hears the ISS.

VLF OPERATIONS

On July 1, SAQ Grimeton Radio, Sweden, the last remaining working Alexanderson transmitter, will be activated on 17.2 kHz.

What were Alexanderson transmitters, you ask? They were high power RF devices using an alternator to pump out a VLF signal directly to an antenna. While not quite as elegant as the latest solid-state devices, these transmitters, built in the 1920s, met many needs and lots were built around the world.

Now, not everyone has a receiver or a suitable antenna on this frequency but the challenge is certainly there.

Higher in frequency though, tests on the UK-only 73kHz band have met with success. On June 3, G3AQC transmitting using 'extremely slow Morse' (a 30-second dot period) was heard by VE1ZJ at a distance of 4408km, more than doubling the previous distance record for this band.

Further tests will be carried out 'with a view to 'receiving a complete callsign' we are told. This is the lowest frequency at which an amateur signal has ever crossed the Atlantic. G3AQC uses a 700W transmitter to put 3.5A of RF into a Marconi antenna, with a 15m vertical section and a 200m horizontal top. But it is not all good

news for RF emanating from the UK. We saw last month in this magazine that the BBC World Service is about to drop all of its short wave broadcasts to both the North and South American continents, and to Australia, from July this year.

What? No more midnight news from the 'Beeb'? Oh dear.

DIGITAL RADIO MONDIALE

Anyway, there is at least some good news on the shortwave front. There is a new digital form of broadcasting likely to be launched within the next two years called 'Digital Radio Mondiale'. Information suggests that the audio quality should be comparable with that delivered by VHF FM monophonic transmissions. I doubt whether my one-valve regenerative receiver, built back when I was 12, will be much good with that lot...

VIDEOPHONES

For real innovation, let's take a peek at the latest from the mobile phone industry.

New technology will see MPEG4 video streaming over future mobile telephone systems to create portable or mobile 'videophones'. Asian operators plan to start in July, and say that mobile video conferencing would be available in 12 to 18 months. We understand that the quality is a little 'basic' at this stage.

Meanwhile, Motorola has added an FM radio music station option to its new cellular phone. We've long wondered why no one offered such an annoyance with mobile phones before.

Technology however does spin off from the development of the mobile phone. 'High electron mobility transistor devices' are in common use today. They are part of every cellular telephone, and are used in other high performance UHF and microwave communications equipment too.

At Osaka University in Japan, researchers are said to have developed 400GHz transistors, which would make them the world's highest frequency transistor. In addition, ARRL News carries one brighter spot for us on the matter of telephones. Look out for 'illegal, high-power cordless telephones 'that operate in the 2m-ham band with 3 to 35W out into a roof-mounted antenna. They play havoc with amateur radio communications.

The ARRL says that it is taking action on these illegal devices in the wake of interference complaints. Given some of the conversations that I hear on 2m around here, I am a little unsure about how best to spot the offenders ...

DISCONTINUE APPROVAL OF WIRELESS TOWERS

In the litigation capital of the world (USA), environmental groups are protesting to the FCC requesting it to discontinue approval of wireless towers until further environmental studies.

The groups claim the towers are a death trap for birds. No, no, not through RF cooking or the like. Rather, it seems birds are colliding with towers during their airborne jaunts.

In response, a pro-tower group has found that the number of birds colliding with trees, power lines, power poles, buildings, including windows on homes, and moving vehicles overwhelmingly surpassed the bird kills associated with towers. Oh dear. The first group, after much deliberation, recommends that 'radio towers should be kept as short as possible'. They tell us that towers present the least risk to birds if they include white strobe lights with short duration flashes and long gaps to minimise the attraction of birds. If they use bright colours on the tower to increase visibility to birds and mark cables with coloured balls or other devices to increase their visibility to birds, things will improve. That should make the neighbours sit up and look! Check the site http://www.comtractowers.com/birds-pr.html if you are a keen birdwatcher.

In the meantime, I'm looking for a way to make the neighbour's dog crash headlong into my tower. It might shut him up ...

MORE RF IN THE HOME

We all might have access to the RF-based Bluetooth system 'real soon', according to a US source. This method of connecting computers, like infrared, will soon be installed on all kinds of devices notebook PCs, digital cameras, and so forth.

At this point, Bluetooth wireless connectivity still costs too much and it may be two or more years yet before the technology is widely available.

But never fear, in the meantime, the US company SBC has introduced 'Home Phone Line Networking'. The technology modulates data as HF radio signals travelling over a home's copper phone lines. And yes, it does radiate into nearby radio receivers. However, fluorescent light local area networking is also almost here to blitz the lot of them. Data transmissions hidden away in the flicker of fluorescent bulbs may soon be the way of the future. That flicker, long the symbol of dreary office life, may spawn a while new technology, thanks to a high-tech start-up module that uses the 'fluoro' as the perfect data transmitter.

'Talking Lights', a Cambridge-based MIT spin-off, has developing a local area network that uses fluctuations in fluorescent lights to transmit data. Inventor, company founder and MIT professor Steven Leeb predicts the technology will be a boon for the disabled, carrying audio and the like.

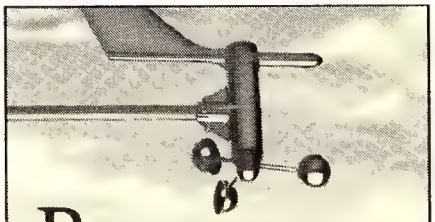
Airlines could turn their planes' cabin lights into a data network, without adding to the miles of wire. 'Fluorescent lights are everywhere,' he says. 'The infrastructure is already in place'. Oh good, flickering lights while we fly off on holiday to escape the dreary office ...

THE 'WOODPECKER' HAS RETURNED

The HF 'over-the-horizon radar system' commonly known as the Woodpecker is used by the military for scanning for surface wave distortion of the ocean caused by the presence of ships, aircraft and missiles. It has been absent for some time now, but you will be thrilled to know, has made its return debut in the 7 MHz band in Europe and in the Middle East.

In the 1970s, I remember that you could buy 'Woodpecker filters' for your rig, but I also found a cheaper solution. If you switch to CW mode, set your keyer to about 25wpm and send a series of dots, the Woodpecker shifts.

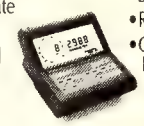
I wonder if in the new millennium, this trick also means that a missile is heading your way? Wouldn't be surprised.



Be your own weatherman.

Why wait for a professional weather report when you can have it at your fingertips anytime you want. The Weather Monitor II offers the most complete state-of-the-art weather monitoring system you can buy.

FEATURES INCLUDE:
- Inside & Outside Temps
- Wind Speed & Direction
- Inside Humidity
- Time & Date
- Barometer
- Wind Chill
- Alarms
- Highs & Lows
- Instant Metric Conversions
- Outside Humidity & Dew Point Option
- Rainfall Option
- Optional PC Interface



WEATHER MONITOR II

SOLAR FLAIR PTY LTD
P.O. Box 18, Emerald, Vic. 3782
(94 Beaconsfield Road)
Ph: 03 59684863 Fax: 03 5968 5810

Neil Duncan VK3ND reviews an interesting duo of related CBs from Uniden...

UHF CB - or HF and UHF all-in-one

There is no doubting the popularity of CB radio these days. Have a listen to either 27 MHz (26 MHz in NZ) or to the UHF 477 MHz channels to see what I mean.

And what about the quality and sophistication of gear available to the CB'er these days! It seems to increase each time you peek at the range on the distributor's shelves. So how do you choose which rig or band to use?

Gear for the HF band (27 MHz) has a special set of advantages, not the least of which are the additional distances that the HF signal will carry. You have a choice of modes AM or SSB with the extra costs of SSB being worthwhile when the limits of distance are being pushed a bit. On the other hand, 477 MHz UHF CB radio is especially good for 'ground wave' or line of sight communication so that coastal, outback and business-style of communications have the edge. The FM mode definitely supplies a superior voice quality and less ambient background noise.

The other factor with UHF Radio is the public repeater systems in use which dramatically increase distance capability. Features like scan, Selcall and CTCSS are also excellent in FM mode.

The two sparkling new units on review here are from Uniden and represents the latest in a long line of specialised communications equipment.

Uniden. That company boasts over two million wireless products produced every month and, would you believe, a cordless phone every 3.2 seconds (hopefully not just one at a time...).

The two small and feature-packed transceivers here, one a UHF CB set and one with both UHF and 27 MHz on board bristle with the latest of features.

THE UH089

The more straightforward of the two sets is the UHF FM monoband radio. In many respects, it seems to be a no-frills UHF CB set, with simplicity of operation being a key feature. But as you proceed down the 'trying it out' path, the number of features hiding in the UH089 really start to surprise you.

It is a small radio with the clear design intention of being mounted in a car. The strong and sensibly designed mounting system leaving you in no doubt about that little matter.

When you plug the set into a suitable source of DC volts (13.8 being the norm these days), you are greeted with a large LCD screen with green backlighting and a lovely large channel number display. The digits 'FM' stay on the whole time. The knob to the left selects which of the 40 channels you would like to use, and the concentric knobs to the right are for squelch (the back one) and for volume.

There are also 5 beautifully backlit buttons neatly lined up along the bottom of the panel, along with a 'function' button hiding under the channel knob.

Quite a few nifty little things can be displayed on that LCD screen. Apart from the giant channel number, it tells you whether you are transmitting, gives the status of various tone and other choices and has a very clear and large receiver signal-strength meter.

Two special innovations of the display are these: First, it tells you the level of transmit output-power and second, it tells you the level of audio arriving at the speaker. I guess there must be some advantage to that latter one...

In its most basic of modes of operation (simplex FM), the UH-089 is excellent. The quality of audio on both transmit and receive is really good and there is plenty of sound from the built-in speaker – provided your car's muffler is working!

A plug for an extension speaker is provided just in case it isn't. On receive, the sensitivity is excellent and there are no problems anywhere with respect to noise, extra signals or the like.

There are three buttons on the microphone. One is the conventional PTT transmit button, a second MONitor button' opens up the squelch so you can check for any weak signals under the noise. If the volume is up loud and you push that button, a lovely loud noise burst sounding rather like hail on a tin roof is emitted, making it a great button for waking up passengers in the car.

The other button is the CALL button. Press it and for two seconds, you will be on transmit with a sound not unlike a Star-trek phaser gun being broadcast for all to hear. It is also great for waking up passengers in the car as (it is meant for paging on-air listeners.)

In addition to 32 normal channels, there are eight channels that can be configured for simplex or for duplex, repeater operation. Simply press the DUP button and although you might be listening on, say channel 1, you will be transmitting on channel 31 (i.e. add 30 channels). The UHF repeaters re-transmit your signal back on the original frequency again.

So what other goodies are there hiding away in the UH089?

According to the manual, you can obtain a headset and after plugging it in, VOX (voice activated transmit receive switching) will be enabled. You also get to have a 'Roger Beep' system in that mode too, should you wish to sound like the Apollo astronauts.

There is an 'Instant Channel' button for storing and recalling your favourite channel quickly, and a fully implemented, 38 tone CTCSS tone system for 'silent, interference free operation'. Sensibly, it is not enabled on the 5/35 Emergency Channels or on the channel 11 calling channel.

There is also a 'busy channel lock' function preventing you from transmitting on a busy channel, a very good idea if you are using CTCSS, a system that makes even the busiest channels sound silent unless they are playing your sub-audible

tone. There is no SELCALL system in the UH-089.

Scanning the channels is always a quick way of seeing what action there is around the place, especially if you are on the road.

There are two kinds of scanning available. Group scan allows the user to program selected channels into the scan function and to scan them only. A common group scan is Channels 1-8 and Channel 40.

Open scan on the other hand, allows the user to quickly scan all 40 channels. This is most commonly used in an emergency situation when communication is needed with anybody that can help your current situation.

In either mode, the UH089 scans channels quickly and efficiently and is simple to use and to deactivate. It scans, stops on a received signal and when the signal disappears, it waits 3 second and resumes scanning. Programming the group scan system is very simple.

Construction of the UH089 is excellent with strength and durability being definitely part of the design criteria at Uniden. The set does not become too warm even after extended transmit times and the manual, while being brief and austere, covers everything that you could possibly need.

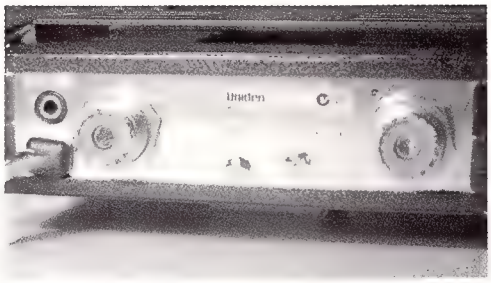
SPECIFICATIONS

UNIDEN Model UH-089 UHF CB Radio

General
Channels: 40
Microphone: 600 ohm, dynamic Type
Speaker: 8 ohm, 3W
Operating Temperature: 0 to 55 deg. C
Power Requirements: 13.8 VDC Nominal
Antenna Impedance: 50 ohms
Transmitter (FM)
Stability: +/- 0.5 kHz
Power: 5W (max)
Spurious Emission: -40 dbm
Current Drain: 1.35 Amps max.
Receiver
Sensitivity at 12dB SINAD: 0.23uV
Adjacent Channel Selectivity (+/-25 kHz): 64dB
Max. Audio Output Power: 3W
Squelch Sensitivity at Threshold: 0.1 uV
Image Rejection Ratio: 60 dB
IF Rejection Ratio: 100dB
Oscillator Dropout Voltage: 9V
Current Drain at NO Signal: 350mA
Current Drain at Max. Output: 730 mA

UNIDEN Model UH090 UHF CB Radio

Additional specifications
Transmitter (AM)
Modulation: Class B AM.
Receiver
Sensitivity: 0.5uV for 10 dB (S+N)/N
Selectivity: 6dB @ 7KHz and 55dB @ 10 KHz
Squelch: Threshold less than 0.5 uV, adjustable
AGC: less than 10dB change in audio output for 10/50 000 uV input.



Pick the difference: UH090 looks similar, but with extra outlet

Operation of the radio is simple and intuitive and will definitely suit the mobile user. In all, the UH089 should prove to be a reliable, high quality and sensible radio suited to a wide variety of purposes.

THE UH090

The rather more unique member of this duo is the combined dual-band HF and UHF CB transceiver, model UH090.

I don't recall seeing such a set anywhere in the world before which is surprising given the number of users who go out and buy both types of radio.

The obvious thing to ask is this – why AM on the HF band? Surely SSB would be the more effective mode?

The answer I suspect, lies in the size of this rig. Actually, the UH090 is exactly the same size as the UH089 which is small enough for a UHF set in the first place. The only exterior, visible differences between the sets are some of the button markings and the extra connector on the back.

To include the SSB mode would have meant a far more complex 'innards' and meant squeezing a range of other functions from the relatively tiny front panel.

There are plenty of people to talk to on HF CB in the AM mode and while in some respects it is disappointing to see that only the AM mode is included in the UH090, at least you now have both bands within a single small box, a single microphone and the with the least amount of space being taken up.

Let's see how Uniden solved a few of the problems.

Are there two squelch knobs? Nope, the one that you have is devoted to HF use. An automatic squelch system with the option to de-sensitise its operation, is built in to the UHF set.

Are there separate channel knobs? Nope, just the one. Change from one band to the other by pressing the FM/AM button and you are back on the last-used channel on that band.

Are there two antenna connectors? Yes, one for each band. You wouldn't think so by looking at the manual though. Clearly, the UHF manual came first and they expanded it to make the HF manual. Some of the diagrams didn't get altered along the way.

How do you know which band you are on? It says either FM or AM on the screen.

Actually, the UHF set, apart from that little matter of the squelch knob, is absolutely identical to the OH089 UHF set. If you skipped the first part of this review, perhaps you may wish to read over it now – the same comments with respect to operation, quality and features apply hereas well.

On 27 MHz, the rig puts out a well-modulated 5 watts of AM signal and has a good sound to it. Don't expect FM sound though. On receive, the set gives rather good 40 channel AM-only operation. Sure it is sensitive enough and as far as I could see, has excellent adjacent channel rejection, but the lack of things like a noise blanker remind you that the AM part of the UH-090 is, in some ways, the add-on part.

The AM scan system is effective with SSB signals being a bit of a nuisance when they pop up. The various 'tone' systems are not implemented on AM.

You can do one more rather nifty thing. There is an Instant Channel for each band. You can make the set listen to your selected channel on one band and have it take the occasional peek at the Instant Channel on the other. This 'dual' system is well thought-out and hints at the kind of target user Uniden have in mind for the radio I should think.

Are there any other any other things about the HF/AM section of the UH-090? Well, the VOX system (which I didn't try out) is not enabled on AM so there goes your chance to show off a Roger Beep to your mates.

To review the set, I used two separate antennae with separate coaxial ones. The antenna connectors on the back are identical which could be a bit of a trap. Uniden has stamped the appropriate lettering in the metalwork below each.

SUMMARY

The newest CB twins on the block, the Uniden UH089 and the UH090 are a worthy pair indeed. Their comprehensive range of features on UHF make them really up-to date sets 'up there' and the inclusion of HF, AM on the UH090 will appeal to a very wide number of users, for reasons of economy, size and simplicity if nothing else.

I enjoyed using both sets and while I find that squelch knob a bit fiddly to get at, have nothing but praise for both. Many thanks to Dick Smith for making the review units available. Check pricing details from your local outlet.

The best of both worlds!

- The first combination AM & UHF transceiver in Australasia
- Super compact size
- Extra large backlit display screen
- Optional hands free operation

AM and UHF transceiver in one Super Compact sized unit.

Give yourself the luxury of both worlds from the name you already trust.

Uniden®

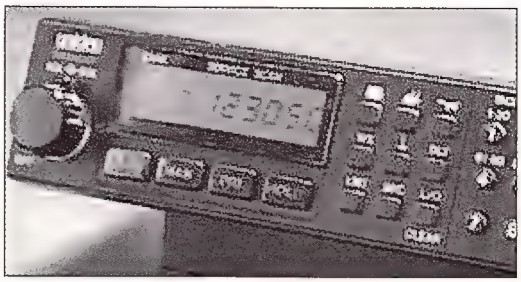
Award Winning Digital Cordless Phones

available from all leading independent retailers. For more information phone (02) 9634 1333 or visit our website www.uniden.com.au

Retro

UNIDEN UBC760XLT Scanner

Russell Bryant checks out a 1990 scanner and reckons that it is worth between $150 - $250 on the used market



Have you ever picked up an old copy of Radio & Communications Magazine or CB Action before it, in an attempt to locate some information, and ended up reading an old review? Immediately after, you decide to track down a pre-loved example of the very radio that was subject of the review for your scanner collection.

As technology floods our world and we are swept up in its wave, we tend to forget about the simpler things in life.

A return to early days of the hobby can often produce unexpected rewards.

Just such a scenario occurred recently to me. While attempting to find an article from a few years back, I came across a review I did on the UBC760XLT scanner.

That was March 1990.

I do not know why the UBC760XLT has the attraction it does, but for a scanner more than 10 years old, it has held its age well. Recently a well known Sydney dealer stated to me that he would love to have 100 UBC760XLTs for sale. They are still a popular receiver finding favour with those who desire a mobile or base unit that doesn't take up a lot of space.

Maybe this was or should I say is, its most salient feature? As stated the UBC760XLT was DIN size mobile or desk top unit that measured just 160 mm X 30 mm X 180 mm and weighed just 500 grams. It boasted a massive 100 memory channels, divided into five banks of twenty.

The Uniden was capable of scanning at a lightning rate of 15 channels per second.

Remember this is 1990. The heady days of thousands of memories and scan speeds measured in warp factors is yet to impact on the hobby in Australia.

Frequency coverage was from 66-88 MHz, 108-136 MHz AM, 136-174 MHz, 350 - 512 MHz and finally the 'new' 800 MHz band 806-956 MHz. With the exception of the air-band VHF, reception was fixed at FM, as were the search step rates for each band.

On VHF mid and high bands it was 5kHz, while the remainder were content with 12.5kHz. Another attribute that endeared the UBC760XLT to the hobby was its excellent sensitivity.

For example, on VHF mid band 66-88 MHz the factory quoted figure was 0.3uV, airband was 0.6uV, VHF high band and UHF was 0.4uV apiece, while 800 MHz was 0.8uV.

Other pluses for the UBC760XLT were five user programmable search banks and, surprise, surprise a BNC antenna connector. While it was not the first to use a BNC, it was certainly close to the top. A welcome deviation from the more widely despised Motorola socket at the time. The UBC760XLT was one of the first scanners to use a non volatile memory backup. This negated the need for an additional battery, simply to keep the memory contents intact should the unit become disconnected from the power.

The unit was capable of delivering three watts of audio to the atmosphere from its bottom mounted speaker.

Which brings me to the first of the not so good points.

The bottom mounted speaker! On a bench, the location of the speaker was not so much of a problem. A set of fold down legs elevated the unit so as to provide an avenue for the sound to escape. Mobile, however, the situation caused many frustrating hours, attempting to find the optimum position to actually hear the audio at a sensible level.

In some cars this is not easy.

An external speaker socket mounted on the rear escutcheon plate went in some way to solving the issue Notwithstanding the fact that a mounting spot was needed for the speaker! Probably the most annoying deficiency of the UBC760XLT, was its lack of filtering With a 10.85 MHz first IF, images manifested themselves everywhere up and down the bands and many owners spent hours wondering why the police could be heard on their 468 MHz band, as well as the 490 MHz band. Selectivity, while generally within acceptable limits for the day, could on occasion let the side down.

A trip to the Sydney CBD with a UBC760XLT was an experience. It didn't matter what frequency was programmed into memory, you heard the lot anyway

Possibly the only other complaint that I and other owners had, was the display back light. It was always on day and night the LEDs glowed, sometimes to the distraction of the operator, especially when driving. Mechanically speaking though the UBC760XLT was a solid, well made receiver. Basically the unit would survive the rigors of day to day life without too much going wrong. Repairers report few if any returns of UBC760XLTs with only one fault being described as problematic.

The most common component that was prone to failure was the coaxial type DC socket located on the rear panel.

The socket was only soldered to the main board, with no actual attachment to anything secure, not an good feature as, over time, it would separate with the constant connecting and disconnecting of the 12 volt lead. The solution, should your UBC760XLT suffer from this, is to resolder the legs, then pack the connector down with hot glue or epoxy resin glue to stop or restrict movement.

What seems to be the norm on all past and present Uniden scanners, is the operation of the squelch control. The volume pot rotates clockwise in the usual manner The mute on the other hand turns counter clockwise. The UBC760XLT is no different

While not a manufacturing fault as such, it has caused confusion amongst some users.

It has also, so I am reliably informed, caused one seller to return a unit to Uniden as defective Assuming you can find a UBC760XLT in good physical as well as electrical condition, what would you expect to pay? Like most things the price varies according to condition, original accessories, including the box and ultimately whether it works.

Prices generally fall between $150 up to and including $250.

A good average indicator is about $200.

A word of advice, don't ring your favourite second hand radio shop tomorrow and expect them to have a good selection of pre-loved units for you to choose from...it's just not going to happen.

The UBC760XLT is still pretty much as popular today as it was when first released over a decade ago so that has to mean something. Most owners hang onto their Unidens and are reluctant to sell and this unwillingness to dispose of the UBC760XLT has caused a scarcity of used units.

Accordingly the second hand market is not over endowed with scanners.

Those that are available should be checked out thoroughly, as their condition maybe suspect.

However, I should say that a friend of mine recently obtained one in a pawn broker's shop for less than $100, so bargains can be had ... all you need to do is look hard and be patient.

Barry Toseland looks at the history of the

R L Drake Company

Established 1943. Founder – Robert Lloyd Drake Snr

Robert Lloyd Drake was the eldest son of four children and also a father of four children.

Born in Cincinnati, Ohio, he attended the University of Cincinnati after graduating from high school in the early 1930's.

Robert was first employed by Dayrad (Dayton Radio Company) in the engineering department, he later moved to the Bendix company in its aviation department. Later he was employed by Bill Lear of Lear Jet fame, again in the engineering department.

Robert had a passion for amateur radio and started experimenting with different designs of filters to improve his reception, as well as his transmitted signal.

His success was evident when the operators he spoke to wanted the same filters for their own equipment.

In 1943 Robert started his own company and left his job with Bill Lear to design and build his products.

H employed three people, one was Katherine Quake who stayed with the company until 1988 and another was Milton Sullivan, a fellow engineer and amateur radio operator.

His products were mainly low and high-pass filters for amateurs and for the military. The filters for amateur radio use were part of the company's product line for more than 40 years, and a tank-jamming device was also produced for the US military. The military also wanted a filter to eliminate jamming, but this could not be done with the Drake design at the time.

He had great difficulty in convincing the US military that it could not be done but his tank-jamming device went on to be used in WWII and at the D-Day landing on June 6, 1944.

After the war recession hit hard; the company managed to survive by continuing production of filters and doing small contract jobs for bigger companies.

In 1953 the company moved its 12 employees to Miamisburg, Ohio to the once-famous Baum Opera House.

The product line now included more accessories for amateur radio including Q-multipliers for HRO and National receivers and product detectors for the Collins Radio Company receivers and the Drake High Patch phone patch.

An amateur himself (W8CYE) Robert modified his Hammarlund receiver for single-sideband (SSB) but was not satisfied with the results and set about designing a better system.

He began designing the SSB 1-A receiver, the first SSB receiver to hit the market. Most amateurs at the time were either on AM or military surplus equipment converted to SSB reception.

There were many older amateurs who considered SSB to be a passing fad and would not replace AM. Once the design was completed Drake was uncertain that he could handle production of the receiver and offered the design to both National and Hammarlund and Hallicrafters but after much discussion with these companies he could not reach an agreement and decided to produce the unit himself.

A good friend and fellow amateur Francis R. Gibb offered to take the first one hundred units, as he was a well-known amateur radio equipment dealer and another dealer, Hyde Rubel of Srepco in Dayton also took and promoted the 1-A receiver and SSB use.

The 1-A was a model of simplicity, no bells and whistles and easy to service, with high quality and performance. Cosmetically it was plain; the front panel was black, as was the cabinet and it was soon dubbed the `Black Mailbox'. Compared to the big, bulky units then on offer it was streamlined.

With the success of the 1-A amateurs still wanted a unit that had AM as well as the new SSB, as AM was still the preferred mode but SSB was gaining popularity The 2-A was produced to meet the demand for both modes, and this was followed by the 2-B with many refinements. Drake offered the 2-B receiver design to Globe Radio and Hallicrafters as he felt uneasy about increasing the size of his company. Unable to reach an agreement he produced the 2-B under the RL Drake company name in 1961.

In 1963 the company introduced its first transceiver the TR-3, a valve unit which used a 9.0 MHz IF and a valve-type VFO and three 12JB6 sweep valves as the finals. The sensitivity was excellent and the 300-watt PEP final output stage gave it punch. The demand was for the TR-3 was beyond Drake's expectation and established the company in the transceiver market.

The sensitivity of the TR-3 was excellent and the 300-watt PEP final output stage gave it punch

THE 'DRAKE TWINS'

In 1966 a new line was introduced, which became known as the `Drake Twins'. The receiver was the R-4 and the transmitter was the T4-X. They had accessories like the W-4 wattmeter, MN-4 matching network, MS-4 matching speaker and the AC-4 power supply.

The R-4 was soon to be replaced by the R-4A and a linear amplifier was introduced, the L-4, with the MN-2000 matching network.

Shortly after the R-4 was introduced the company was approached by Radio New York Worldwide to build a low-cost international shortwave receiver for its own use. This design was similar to the R-4 but with AM only and thus was born the SW-4.

Not wanting to expand beyond its means the company offered the design to RCA who were at the time world leaders in shortwave radios but they had just released the CRM-R6A and declined his offer. Drake went on to release the SW-4A

which was an improved radio - and solid state. In 1966 Drake designed a first in amateur radio equipment. The C-4 line this was housed in a console and had a phone patch, rotor control, wattmeter, equipment control switch, ID timer, 24-hour clock, remote antenna selector and it could also control AC to other units in the shack, so if you turned off the C-4 the other equipment would also shutdown.

It also had a built-in ground device to ground coax lines to protect against lightning strikes (not bad innovations for 33 years ago) Also that year Drake, with the help of Ron Wysong implemented the first printed circuit boards which were used in the audio board of the R4-B receiver. This was the start of the PC fabrication department. In 1967 the 2-C receiver and 2-NT CW transmitter were introduced which filled the gap for the low cost novice market and were popular with many beginners in the hobby.

The TR-4 replaced the TR-3 with many improvements, including solid-state VFO and a BFO circuit. The R4-B, T4-XB and L4-B were all improved designs of earlier versions released in late 1967.

At this point production was at about four to six units a day of most lines.

In 1970 the SPR-4 replaced the SW-4A. This receiver was solid-state and was multimode with AM, SSB, CW, and RTTY

THE DSR-1 RECEIVER WAS INTRODUCED IN LATE 1971

In 1970 the SPR-4 replaced the SW-4A. This receiver was solid-state and was multimode with AM, SSB, CW, and RTTY. Crystals could be added to extend the listening range.

Two metres was also becoming popular and this saw the introduction of the ML-2, a 2-metre FM transceiver. The TR-22 was introduced as a portable 2-metre rig and the TR-22M, a marine transceiver, propelled the company into marine communications.

The TR-22 was replaced by the TR-22C and later by the TR-33; all three were crystal controlled for each channel.

The DSR-1 receiver was introduced in late 1971. It covered the complete HF spectrum, with a digital display using "nixie" tubes; it also offered SSB and AM. It was later followed by the MSR-1, a 19-inch rack-mount commercial receiver that was used aboard ocean going ships as the main receiver.

The DSR-2, MSR-2 and the MSR/FMP followed, with gold contacts on the switches to minimise contact failure due to salt air.

The popular C-Line was introduced in 1973. These units were solid-state with a dual VFO, a plug-in antenna changeover relay in the T4-XC and crystal filters replaced the old pass band tuner in the R4-C.

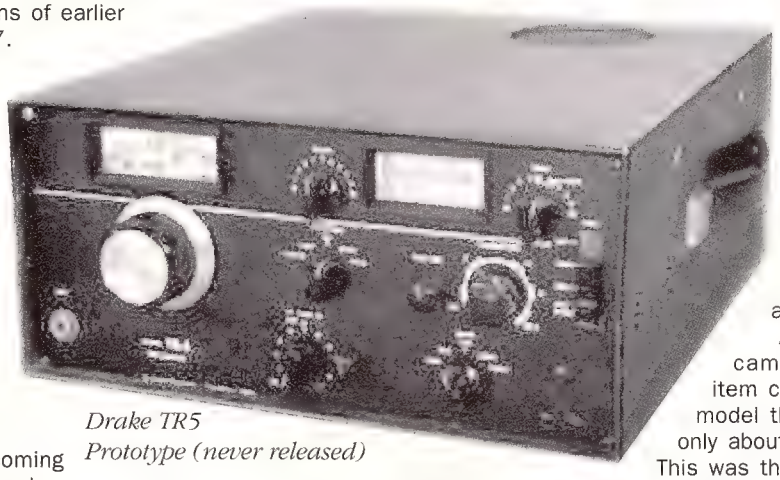
The T4-XC and R4-C are still sought-after units as their performance was excellent. Accessories included the TC-2 2-metre transverter and SC-2 receiving converter, a TC-6 6-metre transverter and SC-6 receiving converter. The TR-6 6-metre transceiver was also introduced that year.

T4 - XC & R4 - C, THE DRAKE C-LINE.

In 1975 amateur radio operators across the world mourned the passing of Robert Drake snr; the amateur radio fraternity had lost a great pioneer in the hobby.

The company was handed over to his son Peter W Drake who Robert had been training to assume the position.

Drake equipment has been sold worldwide and has been owned by some more notable amateurs like the late King Hussein of Jordan and the late Barry Goldwater, Roy Neal and singer-songwriter Ronnie Milsap. At on point the radio room aboard the Queen Mary was all Drake equipped and the famous Voyager satellite is aided by Drake equipment.



Drake TR5
Prototype (never released)

The story doesn't end here. Drake still produces equipment and many amateurs would remember the release of the of the R8 line of Drake receivers, Drake equipment has always maintained a high standard of quality and performance at a price that is within reach of most amateurs.

As an extra to this article I came across an interesting item concerning an older Drake model that was a prototype, with only about 10 ever being produced. This was the TR-5, assembled in the early 1970s with a silk-screened front panel.

It had provision for crystal control with the crystal holder on the front panel. The VFO had TR-5 printed on it but on close inspection it has more likely been lifted from a 4-line series as are the concentric dials which are definitely from the 4-line. It had AC as well as a 12-volt power supply built in.

There is only one of these units in operation at the moment so as you could imagine this is a very rare and valuable radio. As you will see by the photos of the TR-5 prototype and the eventual TR-5 which was produced there was a big difference in looks and design.

TR-5 released version included the then new WARC band

Baudwalking

BBC WORLD SERVICE CUTS IN SERVICE

The British Broadcasting Corporation announced last May that it would be dropping shortwave coverage to North America, Australia and New Zealand as of July 1. In the future, program delivery would be via the streaming audio on the Internet and domestic FM stations. There were howls of protest, and a coalition was formed to attempt to change management's mind. There are numerous reasons why the BBC's plan won't work - at least not for many years to come - and Ralph Brandi (with help of others) created a Website **http://www.savebbc.org/**. The Website completely documents the problems with the management's plan, and includes contact addresses. As we write this before July 1, we don't know the campaign's outcome. The campaign efforts will continue should the BBC carry out its planned shortwave coverage cuts. Check the Website for details.

The BBC show "Write On" has been airing quite a number of letters on the cuts, and we recently found the difficult-to-find Web page that allows one to listen to the show on demand. The show is in Real Audio. The direct page URL is **http://www.bbc.co.uk/worldservice/sitemap/pop_writeon.shtml**.

In mid-June, Ken Baird of Christchurch, New Zealand posted a list of audible frequencies minus those scheduled to be discontinued. If you can't find the BBC on the usual frequencies you monitor, try these. Most should work for eastern Australia, probably less for Western Australia. Baird uses a Drake SW-2 and a SW Eavesdropper multitrap dipole for day-to-day listening, plus a Kenwood R-5000 with a 20m wire.

* 1800z 6195, 9410, 9510, 12095, 15400, 15575, 17830
* 1900z 6005, 6195, 9410, 9630, 11760, 12095, 15105, 15400, 15575, 17830
* 2000z 9410, 11835, 12095, 15400, 17830
* 2100z 9410, 11945, 11835, 12095, 15400
* 2200z 11835, 11955, 12080, 5400
* 2300z 11955, 12095, 15280
* 0000z 15280, 15310, 15360, 17615, 17790
* 0100z 9410, 11955, 15280, 15310, 15360, 17790
* 0200z 9410, 9915, 11955, 12095, 15310, 17790
* 0300z 9410, 11730, 11955, 12095, 15310, 15575, 17760, 17790, 21660
* 0400z 6175, 6195, 7120, 9410, 12035, 12095, 15310, 15575, 17640, 17790, 21660
* 0500z 6005, 6175, 6195, 7260, 9410, 11765, 12095, 15310, 15360, 15420, 17640, 17790, 17885, 21660
* 0600z 6005, 6175, 6195, 7160, 9410, 11760, 11765, 12095, 15310, 15360, 17640, 17760, 17790, 21660
* 0700z 9410, 11765, 12095, 15310, 15360, 15400, 15485, 15565, 17640, 17790, 17830
* 0800z 11955, 12095, 15360, 15400, 15485, 15565, 17640, 17760
* 0900z 6195, 9605, 9740, 12095, 15190, 15360, 15565
* 1000z 6195, 9740, 12095, 15360, 15575

REPEATER LINKING

The following item appeared in the May 2 edition of the VK3APC newsletter.

Dial the World on Ham Radio with IRLP

Now here's a scenario worth thinking about.

Imagine that you're driving around town, or just taking a leisurely walk, and suddenly remember that you have to contact your mate in Perth to pass on a message.

You turn on your VHF/UHF rig, tune to the local 70cm repeater and punch a 4-digit code, into the DTMF keypad. The repeater responds with "Welcome to VK6RNC in Perth", and you then proceed to talk to your amateur mate in VK6.

Late at night, on the way home from a party, you dial another 4 digit code into the repeater and connect to a conference based in Denver, Colorado, where people from all over the world are chatting.

Does this all sound like the stuff of science fiction, pipe dreams, or perhaps a commercial for a new mobile phone?

No fear, this is IRLP - The Internet Radio Linking Project, and yes, it's already in Australia!

During a recent six-day stay in Sydney, Tony VK3JED was able to experience IRLP at first hand, and despite some difficulties with propagation and pagers in the centre of Sydney, he managed several contacts with VE stations, using nothing more than a 5-watt handheld radio.

"This sounds great", you say, " then why don't we have IRLP here in Melbourne"?

The simple answer is, because no one has yet bothered to set up an IRLP node in VK3.

In other words, if we want IRLP, someone has to install it. Setting up an IRLP node isn't particularly difficult, according to Peter, VK2YX, who runs the IRLP node on VK2RBM.

You need a computer, Pentium 100 or faster with a SoundBlaster 16 or SB 32 AWE, running Red Hat Linux 6.2, an Internet connection, preferably ISDN or faster that you can dedicate to the node, a suitable radio for the link, a repeater with suitable CTCSS facilities, and around $200 to pay for the IRLP hardware to connect your PC to the radio.

If you can manage that, you're ready to link the repeater to the world. This could be a very good project for clubs to take on, and IRLP is proving popular with both hams and SWLs alike.

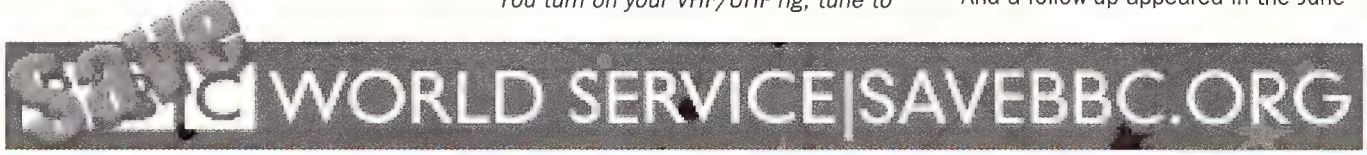
Tony would be happy to provide help to anyone wishing to set up IRLP on a repeater.

For more information, you can visit Tony VK3JED on http://www.qsl.net/vk3jed/irlp.html or go straight to the IRLP home page at http://www.irlp.net/.

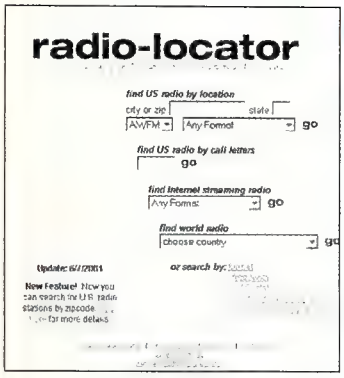
Sounds pretty good stuff, so perhaps we should get Tony to tell us all a bit more at an upcoming club meeting.

(Keith VK3JNB / Tony VK3JED)

And a follow-up appeared in the June



THE INTERNET, E-MAIL AND OTHER THINGS OF GENERAL INTEREST ***By Thomas R. Sundstrom, W2XQ***



BROADCASTING DIRECTORIES

One of the oldest Internet lists of radio stations with Websites was started by MIT in Massachusetts, USA. The "MIT List of Radio Stations on the Web" pages were cared for by the staff of MIT's station WMBR at **http://wmbr.mit.edu/stations/list.html**. A text list, it was plain and long but it was surprisingly complete. The list is now under the care and feeding of Theodric Technologies in Cambridge, Massachusetts, home to MIT. Now known as "Radio-Locator", the new URL is simply **http://www.radio-locator.com/**

6 newsletter, from Tony, VK3JED:

Melbourne to get Internet repeater link

Two local clubs are behind moves to introduce Internet repeater linking (or IRLP) to the Melbourne area. A joint venture between the Moorabbin & District Radio Club and the Geelong Amateur Radio Club will allow amateurs to speak overseas via local repeaters.

The GARC will provide the repeater while the MDRC will sponsor the IRLP gateway. Previously, the project was being run privately by several Melbourne amateurs. MDRC's involvement ensures sufficient funds to meet initial set-up costs and ongoing licence fees for the RF link between the Internet gateway and the VK3RGL repeater.

In other IRLP developments:

David VK3JDA and Tony VK3JED met with key members of the Geelong Amateur Radio Club and discussed the IRLP project in detail.

The GARC approved the use of VK3RGL on two metres initially, with the link moving to VK3RGL on 70cm when this is upgraded.

The system should be on the air now.

Those interested in learning more about this exciting new aspect of amateur radio should read Bob Bell's article on "Breaking New Ground" in our last (July) issue of R&C. Editor.

Lucent Bell Labs scientist Jim West with the very high-tech helmet of Jordan driver Heinz-Harald Frentzen.

IRAQI DOMESTIC BROADCASTS

Watch Iraqi TV or listen to Iraqi radio on the Internet. A new Website appeared that offers both services. Interestingly, we traced the domain back to Lebanon.

The WHOIS data?

person:	Imad Tarabay
address:	Fiberlink Networks Lebanon
address:	Australia St - Sakhra Bld First Floor
address:	Beirut - Lebanon
phone:	+961 1 799996
phone:	+961 3 607686
fax-no:	+961 1 792811
e-mail:	imad@fiberlinknet works.net
nic-hdl:	IT727-RIPE
changed:	makkouka@fiberlinknet works.net 20010329
source:	RIPE

Andy Sennitt of Radio Netherlands tells me these feeds are coming off satellites. Interesting, indeed. We found the combination of Internet Explorer and Windows Media Player works the best. Dial into **http://www.iraqtv.ws/**.

FORMULA 1

You may soon hear more conversations between the driver and the pit during the Australian Grand Prix. During a race, communications are limited, as drivers have to shout to be heard over the roar of 800 horses running at 18,000rpm. Cockpit noise has

CELLULAR PHONE ENCRYPTION

I used to be that the most communications gadgets were reserved for military and security services. Now, a German company is selling a cellular phone that offers consumers military grade privacy. The TopSec cellphone is being marketed towards corporate executives and government officials who want to discuss sensitive matters no matter where they are. The US$3,000 phone is marketed by Rhode & Schwarz, the Munich based company that modified the Siemens S35i radio telephone to add the security features.

A few hundred phones have been sold, but the expected worldwide market is some 20,000 to 30,000 customers.

The phone is only available in areas supporting GSM (Global System for Mobile Communications) many in Europe and Asia. Frequencies are in the 900 and 1800MHz ranges, encryption is a combination of 1024 and 128 bit, talktime is three hours and standby is 130 hours.

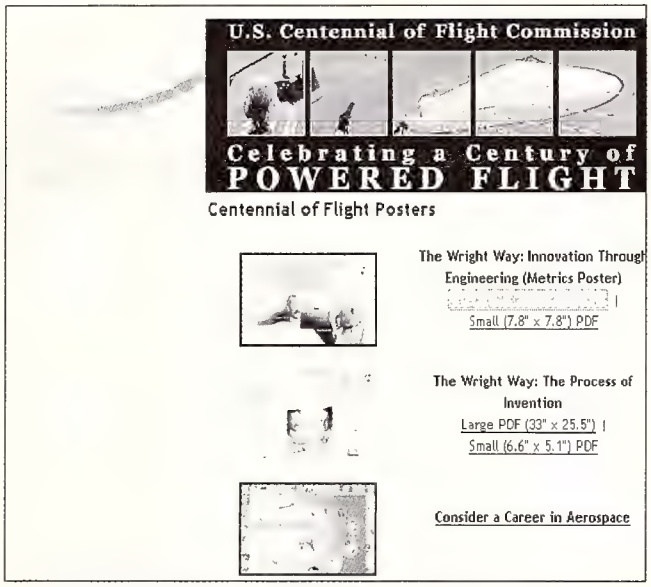
The following was posted on Rohde & Schwarz's website on May 21:

IT Security

Rohde & Schwarz takes over Siemens hardware cryptology segment

22.05.2001 - As of 1 May, Rohde & Schwarz SIT has taken over the hardware cryptology segment of Siemens ICM. All Siemens key personnel have been integrated in the Rohde & Schwarz SIT security team. "This step has brought us market leadership in Germany," explains Henning Krieghoff, managing director of Rohde & Schwarz SIT GmbH. The aim of the take-over is to bundle the capacities and expertise of both companies in the field of professional crypto solutions, thus enabling Rohde & Schwarz to supplement its existing product spectrum in this area. The products acquired include not only the ELCRO DAT 6.2 (SDH encryption device, but also the TopSec GSM crypto mobile phone. This means that Rohde & Schwarz is now Germany's leading provider of crypto solutions for official and commercial applications. Siemens intends to concentrate more on its core business in mobile communications.

Check out the rest of the details at http://www.rohde-schwarz.com/


U.S. Centennial of Flight Commission
Celebrating a Century of
POWERED FLIGHT
Centennial of Flight Posters
The Wright Way: Innovation Through Engineering (Metrics Poster)
Small (7.8" x 7.8") PDF
The Wright Way: The Process of Invention
Large PDF (33" x 25.5") |
Small (6.6" x 5.1") PDF
Consider a Career in Aerospace

Counting Down to 17 December 2003

Quick - without looking it up - what's significant about December 17, 2003? If your immediate answer isn't that it's the 100th anniversary of powered flight as first demonstrated by the Wright Brothers, hopefully that will change. Just check out:

http://www.centennialofflight.gov

The US Centennial of Flight Commission has launched this Website to get the word out on the history and future of powered flight and keep track of events planned to celebrate the upcoming anniversary. The site also features a section dedicated to educational activities and programs related to the past, present and future of flight.

QUICKIES

The IARU, International Amateur Radio Union, has published a brochure on "Amateur Service Spectrum Requirements at 7MHz" available for download (670kB, PDF-File) from their Website at **http://www.iaru.org/7-MHz-Spectrum.pdf.** The paper discusses shifting the 40m band away from the broadcasters, and expanding the amateur-exclusive 100kHz bandwidth at 7 to 7.1MHz.

Are you coming to the USA for a visit and bringing a scanner? Check out "CityFreq" for not only emergency services but also other local business and organisations. We like it: **http://www.cityfreq.com/**.

Or are you looking for a USA company or telephone number? Verizon, formally BellAtlantic, one of the largest of the Baby Bells after the AT&T break-up years ago, has a new all-encompassing directory Website that may help. The directory is nationwide. Check out **http://www.superpages.com/**.

Check out the latest computer virus news and rumours at F-Secure, a heavy-duty data security firm based in Finland. Though an individual probably will not make use of the company's services, the home page has a section (currently at the lower left of the home page) titled "Security Alerts". It is recommended reading. Trip over to **http://www.fsecure.com/** and have a look.

been measured at 130 dB, louder than a jet aircraft engine.

Now Lucent Technologies has signed on as a sponsor to the Jordan team, and one of its first tasks is to improve the radio technology. The concept? Noise cancellation. It compares the sound of a microphone on the motor to that entering a second microphone on the helmet, and then subtracts the engine noise from the driver's words. The technology hopefully will be perfected by the end of this F1 season.

I hope that this news story remains on line, as it appeared a few days before the Montreal GP on the first weekend of June. Unfortunately, we didn't get to Montreal this year, due to the broken foot, so we couldn't investigate further. Try this URL: **http://www.montrealgazette.com/f1/010604/5105025.html/.**

EARTH'S INVISIBLE MAGNETIC TAIL

The first large-scale pictures of the hidden machinations of the Earth's magnetic force field are now available, including confirmation of a suspected, but previously invisible "tail" of electrified gas.

The tail, which streams from Earth towards the Sun, was spotted by NASA's Imager for Magnetopause to Aurora Global Exploration (IMAGE). The new imaging technology offers unprecedented views of the transparent, electrified gas trapped within Earth's magnetic field, providing the first visual, global perspective on magnetic storms. The tail structure is believed to be a return flow of plasma that occurs when the solar wind (a plasma flow ejected continuously from the solar surface) buffets the magnetosphere and distorts its shape. For example, at first a falling raindrop is roughly spherical. As it falls and gains speed, air resistance causes the droplet to change shape as water is dragged from the bottom (head) to the top (tail). Surface tension prevents most of the water from simply dispersing from the tail, so it is forced to flow within the raindrop and return to the head.

The solar wind distorts the Earth's magnetosphere in a similar way, compressing it on the Earth's day side, like the head of a raindrop. The region is stretched on the night side, like the raindrop tail, forming a teardrop shape.

Plasma near the boundaries of the magnetosphere is dragged with the solar wind, but then is turned around and forced back towards the sun, moving around the Earth in tail-like flows. Although the plasma tails were expected, IMAGE discovered areas in Earth's plasma cloud that are nearly empty of plasma. The IMAGE team calls these unexpected structures "troughs" and is trying to discover how they form. Images and more information are available at: **http://www.gsfc.nasa.gov/GSFC/SpaceSci/sun-earth/imagescience.htm**

SPYWARE

A while ago, we mentioned spyware software that reports on the software and operation of the PC. Regular contributor John Graham points out an anti-spyware program that he is quite happy with. We did not know about Lavasoft's Ad Aware, from Germany, available in two flavours: one that can be run on demand and a second that monitors programs as installed. Version 4.6 monitors Adware, Alexa 1.0-5.0, Aureate v1.0, 2.0 and 3.0, Comet Cursor v1.0,v2.0 and v3.0, Cydoor, Doubleclick, DSSAgent, Ever-Ad, Gratisware, OnFlow, SaveNow, Flyswat, Gator, TimeSink v1.0, v2.0 and v5.0, HotBar, Web3000 and Webhancer. Check it out at **http://www.lavasoft.de/aaw/**.

THE INTERNET, E-MAIL AND OTHER THINGS OF GENERAL INTEREST ***By Thomas R. Sundstrom, W2XQ***

Colin Halsey, catching up on his back reading, and comments that Surf Saver (December) is a spyware program. He found it by using a freeware program called "Spy Chaser" available from Camtech 2000 **(http://camtech2000.net/)**. We looked at Spy Chaser and it has a long list of known spyware programs within.

Unfortunately, you have to enter the name of the suspect program into a dialogue box – we'd rather have it search out the bad guys automatically. Nevertheless, the price is right. Camtech has a lot of other interesting free utility software available for download. Take a look.

POPUP BROWSER WINDOWS

The popup browser windows encountered when one wanders onto some Websites - Geocities, Tripod, Angelfire and the like – can be downright annoying. For a number of years we have been using Killad (**http://wwwwin.wplus.net/pp/fsc/**), but it has not been updated since 1999 and not all the new popup windows are being caught.

We found a new contender that seems to be quite fast and efficient, and the program is actively supported at this time. Preliminary tests suggest it is well worth a look. Try out Popup Killer for Windows at **http://software.xfx.net/utilities/popupkiller/**. It is a free download.

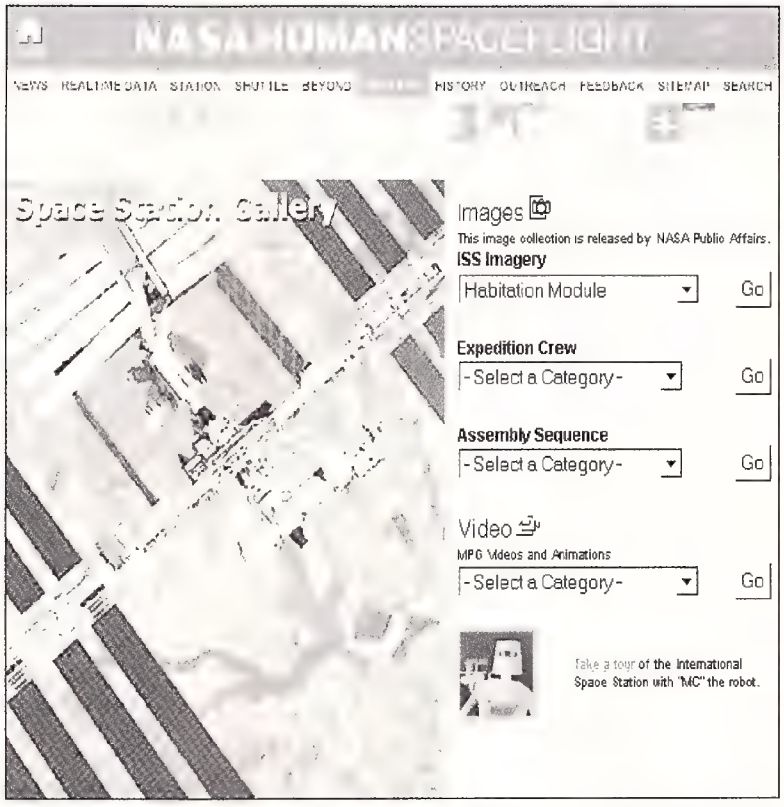
HAM RADIO MANUFACTURER CLOSES DOWN

USA amateur radio manufacturer Kachina **(http://www.kachina-az.com/)** announced the closure of its amateur radio business on May 24, immediately discontinuing production of all HF equipment including the 505DSP transceiver and related equipment. Vice president Cameron Earnshaw wrote, "... given the reduced worldwide demand for amateur radio in general, and HF radio in particular, it seems the only sensible choice for us to make...

"Unfortunately, we do not have the resources of a Kenwood or Yaesu, and simply cannot afford to support an unprofitable product line indefinitely."

Read the full statement at **http://www.kachina-az.com/hf_products.htm**. The company will continue in the business of broadband wireless Internet services in the Arizona area.

Let us know what you've discovered this month. E-mail us at **trs@trsc.com**. Visit us at our Website **http://www.trsc.com/**.



USA's NASA has set up a Website to show the human side of the space station. Learn about the astronauts and get a different perspective on board the ISS at **http://spaceflight.nasa.gov/snapshots.html**.

Belden

-¤ RG58C/U Belden 8259 @ $0.90 per metre¤
-¤ RG213/U Belden 8267 @ $4.45 per metre¤
-¤ RG8/U Belden 9913 Low Loss @ $5.15 per metre¤
-¤ RG8/U Belden 9913F7 High Flex Low Loss @ $5.55 per metre¤
-¤ RG8/U - RF400 Belden 7810 Low Loss Sweep Tested to 6000MHz @ $6.30 per metre

LINK

-¤ RG58:¤¤ B80-006 UHF connector (M) @ $7.65 each¤
-¤ RG8/213:¤ B80-001 UHF connector (M) @ $8.80 each¤
-¤ RG213:¤ B30-001 N connector (M) @ $9.10 each¤
-¤ RG8:¤¤ B30-041 N connector(M) @ $14.00 each¤
¤ ¤

TOOLS:¤ Coax Cutters: C.K. @ $40.00 each¤
¤¤ Strippers: Ideal - RG58 @ $33.00 each and RG8/213 @ $53.00 each

* All prices include GST¤
* Minimum order value $50 payable by Visa, Mastercard, Bankcard or Money Order¤
* Packing and Delivery $15 within Australia (Outside Australia P.O.A.)

Further Information: email - sales @elektron.com.au or Phone: (03) 9761-3207¤
Elektron Pty Ltd, Unit 2, 14 Melrich Road, Bayswater, Victoria 3153.

ELEKTRON
ABN: 62 088 051 030

SINGAPORE ... BARGAIN CITY

Radio amateurs will find an abundance of bargains in Singapore, where haggling is still much part of the culture. By Jack Haden VK2GJH

With the Australian dollar not doing too well on the international scene, there's not too many places left abroad where we can still get value for money, and have an enjoyable overseas holiday at the same time. Like most travelling abroad, many of us like to pick up the odd bargain or two along the way, especially when it means saving big bucks on the prices back home. Radio amateurs will find an abundance of bargains in Singapore, where haggling is still much part of the culture.

Singapore has long been a favourite for Australian travellers, it's only eight hours flying time from Sydney and the airfares are quite cheap. During the low season one can snap up a round trip to the Lion City for as little as $450 return ex Sydney, considerably less than the standard economy fare to Perth and back! The best deals include four nights' accommodation for around $950 including airfares.

Lying just off the southern tip of Peninsula Malaysia and a little north of the equator, Singapore enjoys are very tropical climate, with little temperature variation, all year round. English is the national language so there's no language problems, and one can interact with the locals easily. Shopping and the vibrant nightlife are one of the many draw cards.

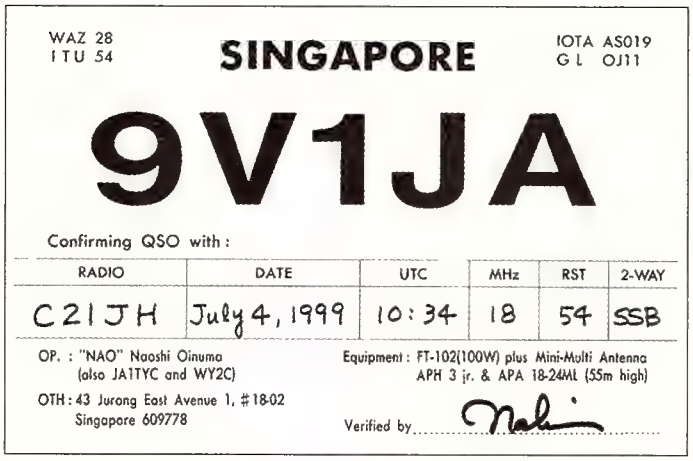
You can forget about car rental too, Singapore has one of the best public transport systems in Southeast Asia at economical prices too. Singapore's founding father and longest serving Prime Minister, Lee Kwan Yew built up the former British colony on a very nationalistic basis. Hard work, thrift and cleanliness, with a focus on education made the country one of the best success stories of all time. Although Yew resigned in 1990 the legacy of his hard work still lives on today.

THE SIGHTS

One of the weaker points of mass development coupled with modernisation, is that many of the old and interesting buildings of historical significance were torn down, replaced with huge office towers and apartment blocks, so only a few remain today. For Australian's interested in WW-II history a visit to the Kranji War Memorial & Cemetery is a must. Many Aussie diggers were laid to rest here, just a stone throw from the very causeway the Japanese marched across, into Singapore on the 15th of Feb 1942, from Johor Bahru in Malaysia culminating in the British surrender.

Singapore is a very family orientated destination so there's always something of interest for the children to do. My six-year-old daughter Anne-Maree loved riding the London styled double deck buses and visiting the Sentosa Island theme park, linked to Singapore by cable car and ferry services. Jurong Bird Park and the nearby Reptile Park are also well worth a visit not forgetting the wild monkeys roaming Bukit Timah Nature Reserve. Singapore Zoo is one of the best you will find in Asia and takes a good day to see properly, the night safari is a must do as well.

Being a small island all attractions can be reached by bus or train in just under an hour from the down town city area. You can even shoot across the causeway by public bus for some shopping in Johor Bahru in Peninsular Malaysia, or take a 45 minute ferry trip to Batam in the Riau Islands in Indonesia, both are interesting day trips, you'll need to take your passport on both trips.



WAZ 28
ITU 54

SINGAPORE

IOTA AS019
GL OJ11

9V1JA

Confirming QSO with :

RADIO	DATE	UTC	MHz	RST	2-WAY
C21JH	July 4, 1999	10:34	18	54	SSB

OP. : "NAO" Naoshi Oinuma
(also JA1TYC and WY2C)

OTH : 43 Jurong East Avenue 1, #18-02
Singapore 609778

Equipment : FT-102(100W) plus Mini-Multi Antenna
APH 3 jr. & APA 18-24Ml (55m high)

Verified by

AMATEUR RADIO

Unlike Australia, there's a strict limit on two-metre operation in Singapore, so it's best to leave the hand held at home. Local amateurs must obtain a temporary permit from the authorities to operate on 2m. With these restrictions in place there's no repeaters on 2m at all, and unlikely to be in the near future, so for the locals it's simplex or nothing.

Over 90% of the population live in high rise apartments, similar to that of Hong Kong, so any HF operation with a large antenna array is more or less out of the question too. Nao 9V1JA said that permission to erect any transmitting antenna on an apartment block roof was near impossible. The building's resident committee would be sure to veto it, not to mention the worry of potential TVI/BCI problems that could arise.

So, that's why we don't hear many Big Gun signals out of Singapore, not to mention that 100 watts output is the limit on HF too, so forget about the kilowatt plus grunt boxes. Running just 100 watts into a small inconspicuous balcony mounted antenna from an apartment block isn't very appealing in the eyes of many potential Singaporean DX chasers. However, there are a few diehards active from apartment blocks with low power into small balcony mounted or indoor antennas.

50MHz is another band that doesn't rate very high with the Singapore authorities. To operate on six a special temporary permit must be obtained from the authorities and is usually valid for only four months. After the permit expires you have to repeat the application process once again, currently there are four six metre permits in operation from Singapore.

Holders of VHF permits are not permitted any mobile or portable operation of any kind, fixed station only at the licensed address and nowhere else! On 50MHz the power is limited to 50 watts with 50.000 to 50.150MHz the limit of recep-

tion and transmission. A very peculiar rule is that out-of-band monitoring is not permitted, so if you tune for TV indicators between 45-49MHz you are really breaking the law, however, it would be a most difficult one to enforce.

I wondered how scanner operators would fair under Singapore rules? Maybe scanners are illegal in Singapore? During my travels I failed to see one discone antenna anywhere on the island, perhaps they were hidden indoors?

DUTY FREE RIGS

Despite numerous restrictions on the amateur radio hobby there's no shortage of equipment for sale. The best place for equipment is the Sim Lim Tower complex, which is basically the electronics equipment sales centre for Singapore.

The complex is situated on the borders of Little India and the Colonial District on busy Jalan Besar Road; the communications section is in the basement level and 1st floor on street level.

All the big brand names are there, dispensed from around six communications orientated shops, the range is quite good. All the shops display a sign in the window stating equipment is not for sale to local residents, export by foreign passport holders only.

The range of transceivers is quite broad, with Icom, Kenwood and Yaesu amateur and commercial rigs for sale at tax free prices plus Alinco and Motorola, quite a lot cheaper than Australian prices too I might add.

Superstar CB radio equipment plus scanners were also on offer, and again, not for sale to local residents. One particular store had a very impressive array of the big name VHF and HF antennas too at more than reasonable prices.

Suneast Pty Ltd had a very impressive range of amateur gear, so did Tecomart with general manager Mr Uthaman Chettiar very hospitable to foreigners visiting his store. You can visit his web site at Http://www.yellowpages.com.sg/ad98/tecomart.htm where you take in some really cheap prices.

I asked Uthaman how they make any business out of amateur radio due to the fact that Singapore only has a very small amateur radio community? Uthaman said "Well Jack, our main revenue source is commercial communications equipment sold to businesses here in Singapore, marine VHF equipment is a big mover as Singapore has the busiest port in Asia. We also sell hand held and mobile commercial UHF transceivers to transport and construction companies, an important breadwinner for us. Radio amateurs from other neighbouring countries like Malaysia, Indonesia and Thailand come here to purchase their communications needs due to a lack of prominent traders back home. So our export market is quite

progressive too"

BUT THERE'S MORE

Other odds and ends I noticed included HF/VHF linear amplifiers, antenna tuners, CW keys, coax, plugs and desk mikes being popular lines. When I enquired about second hand equipment for sale, one storekeeper said that I wouldn't find any. Reason being, many Asian people don't believe in buying used equipment, a sort of cultural thing.

HOME BREW CORNER

There are a number of shops catering for the home brew enthusiast; all types of components are on offer. Some of these stores export to neighbouring ASEAN countries and also to Europe and North America.

First prize for the store with the most components must surely go to the ever-busy Mr. Jimmy Ng; with over a million components in stock to chose from, rows and rows of components stacked to the ceiling fill Jimmy's shop. Jimmy trades as Y.H. Radio & Electrical Trader and even exports to Japan of all places.

Jimmy says his main market is directed to people seeking parts for video, audio, television, computer and photo machine equipment. Outside the electronics suburb of Akihabara, in Tokyo, I have never seen so many components in one shop in my life. Jimmy said "Jack, you name it, I have it in stock, if I haven't got it, then it's not available on the island. My store is the biggest importer and exporter of transistor I/C's and spare parts components in Singapore, I send stock all over the world."

One thing that struck my mind was the absence of a computer to keep track of all this stock; Jimmy had an answer for that too. "I don't need a computer like the other shops Jack, my brain is the computer here, ask me for a component and I will tell you now if I have it and take you straight to it!" Well, there's a man who really knows his own mind eh?

COMPUTERS GALORE

Computer shops abound in every district of Singapore, all the major brand names are there, and like amateur radio equipment, so much cheaper than back home in Australia. My relatively new Hewlett Packard computer was nearly $650 cheaper in Singapore (after working out the exchange rate), not to mention software at very attractive prices. The majority of software sold comes with an international warranty which is comforting should something go amiss when you get it back home!

Those wishing to save even more dollars could venture across the border into Malaysia and buy some dirt-cheap pirated software from the numerous vendors in Johor Bahru. However, the reliability of this software is often questionable.

There a number of computer shops that cater to those who prefer to build their own machines rather than buy a ready-made brand name. On weekends, it's nearly impossible to move in some of these shops as resident geeks and visitors alike seek out the bargains. Many have Internet cafes as well; the Internet is very popular with the young people of Singapore with cafÈ's full up on weekends and after school.

IN CONCLUSION

So there we are, there's plenty to do in Singapore and plenty of potential bargains for visiting radio amateurs too. The once traditional duty free items such as watches, perfumes, cigars and alcohol are no longer the bargains they were once famous for. Special thanks go to British Airways, the New Park Centra Hotel, Nao 9V1JA and the Singapore Tourist Board.
73 de Jack VK2GJH.

End-Fed Halfwave Antenna

By **Stephen R. Yates**, AA5TB

I often take my QRP gear into the field during camping trips, and the less antenna gear I need, the better. With the end-fed halfwave all I need is a short feed line to my coupler, a half wavelength of wire, and a bit of rope and I'm all set.

This antenna is as old as radio and is probably best known as the Zepp antenna, named after the airship in which it was commonly used - the Zeppelin.

Since the early days of radio, the wavelengths used were very long, and the antennas were also long.

An end-fed antenna that could be trailed behind the airship was much easier to implement then a centre-fed dipole or a 1/4-wavelength antenna which required an extensive ground plane to function properly.

Amateur radio operators had found that when cut as a half wavelength on the lowest frequency of operation it would still load as a voltage-fed antenna at all harmonic-related frequencies, and it was often more convenient to feed the antenna at its end rather then in the centre. The main reason I like the end-fed halfwave is that it makes an excellent portable antenna for the field. I often take my QRP gear into the field during camping trips, and the less antenna gear I need, the better.

With the end-fed halfwave all I need is a short feed line to my coupler, a half wavelength of wire, and a bit of rope and I'm all set. The feedpoint usually ends up near the ground and if possible, I prefer to run the wire vertically although I've had very good success with it run out horizontally only about 3m (10ft) in the air.

When used as a vertical the end-fed halfwave is ideal because, like the dipole antenna, it is self-completing (because it is a dipole!). That is, it doesn't require a return path or "counterpoise" to properly radiate.

THIS MAKES IT AN IDEAL PORTABLE ANTENNA.

There are many portable antenna designs that really require an extensive ground plane to be efficient, such as the 1/4 monopole or loaded versions of such.

Even though the 1/4 monopoles with a few radials will work and often work well, there is no escaping the fact that power is being wasted in the ground and I don't think carrying around a bunch of radials is all that much fun. The last statement about this antenna requiring no radials has been debated extensively.

In ON4UN's book, ON4UN's *Low-Band DXing* he has modelled the vertical end-fed halfwave antenna and has shown that a radial system with numerous, very long radials will increase its performance.

He indicates how currents are indeed set up within the ground and losses will occur if radials aren't used.

Therefore, he concludes that radials must still be used. I agree with his data but I disagree with his conclusion.

I disagree because the currents set up in the ground are maximum at about 1/4 to 1/3 wavelength from the base of the antenna, unlike the 1/4 monopole that has a maximum ground current density right at the base.

The other fact is that with the 1/4 wave antenna, this return current in the ground is required for the antenna to function.

For the 1/2 wave antenna, the ground current is there simply due to the ground being in the near field of the antenna. The higher you raise the antenna, the less current there will be in the ground.

In practice, I have found that the vertical end-fed halfwave with no radials outperforms a horizontal dipole at about 6.5m (20ft) on 20m on short and long paths. Sure, many radials one wavelength long may improve the performance a fraction of a dB but if it already works great, why go to the trouble during portable operation? If you were creating a contest station on your ranch, you may want to provide this elaborate ground system.

Others have suggested that one 1/4 wavelength radial should be used to keep the coupler at a low impedance. This might make you feel better about keeping RF at bay near the coupler, but in practice, I haven't needed it.

In fact, if this does make a difference then current must be flowing in this 1/4 wavelength of wire and since there is only one wire, it will radiate.

Having part of your antenna lying on the ground can't be all that great.

Keep in mind though, nearly all of my operations are at QRP power levels and at high power levels, this may help prevent RF burns.

Personally, I'd rather just run low power and have all of it radiate instead of using high power to heat up the ground.

There are several ways to feed an end-fed halfwave antenna.

These methods can be put into two categories:

1. Tuned circuits, using lumped components.
2. Transmission line transformers.

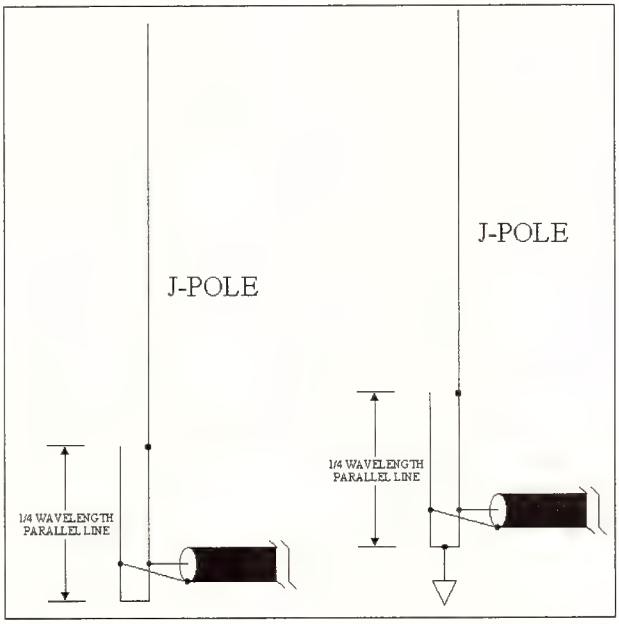
The idea is to convert the very high impedance of the antenna (usually around 5k ohms in real life) down to the relatively low impedance (50 ohms) of the transmission line.

Now it should be known that if the antenna was infinitely thin, in outer space, and was exactly resonant no energy could be coupled into this antenna using this method (this is what the physicists will tell you).

If things were perfect, you would have to couple into the antenna 30-60cm (1-2ft).from the end. This would mean that the antenna would be on one side and a very short return wire on the other.

This would present a small amount of capacitive coupling from one side of the circuit to the other, and RF current would flow.

Luckily, things are never perfect and this situation usually exists anyway. Therefore, a small return wire may be necessary although there is usually enough stray capacitance from one side of the circuit to the other to satisfy this requirement without any additional return wires.



When using lumped components, a parallel circuit is connected to the end of the antenna and tuned to resonance at the operating frequency. This parallel-tuned (tank) circuit also presents a high impedance and easily couples to the antenna.

To step the impedance down to 50 ohms you can use either a small winding around the "cold" end of the main coil in the parallel circuit as a primary winding, or simply use a tap on the main winding just up from the "cold" end of the main coil.

The latter approach is essentially an autotransformer and the tap that presents the lowest VSWR at the resonant frequency is the correct one.

A Cushcraft Ringo is another example of this type of antenna.

It is essentially using the autotransformer parallel-tuned circuit approach, but, since the frequency is so high, the main coil is just one turn of aluminium.

When using a transmission line as a transformer, a length of line that is roughly 1/4 electrical wave in length is used.

The velocity factor of the line must be taken into account and can vary from one brand or type of transmission line to another.

Essentially, what we do is use a section of transmission line to transform the high impedance of the antenna (~5000 ohms) down to about 50 ohms. Then, across the feedpoint we place a short section of shorted transmission (stub) line to finish the transformation.

A J-POLE ANTENNA

It is often described as a shorted section of a 1/4-wavelength transmission line that is tapped at the 50-ohm point.

We usually would want a way to ensure the external currents are not coupled onto the coax, with some form of a balun, although most designs do not incorporate such a device.

J-Pole antennas are very common for VHF/UHF operation although most users don't realise they are using an end-fed halfwave antenna.

Here are various methods of feeding an end-fed halfwave antenna (The return connection can be ground or just enough conductor to present a bit of stray capacitance).

EXPERIMENTAL RESULTS

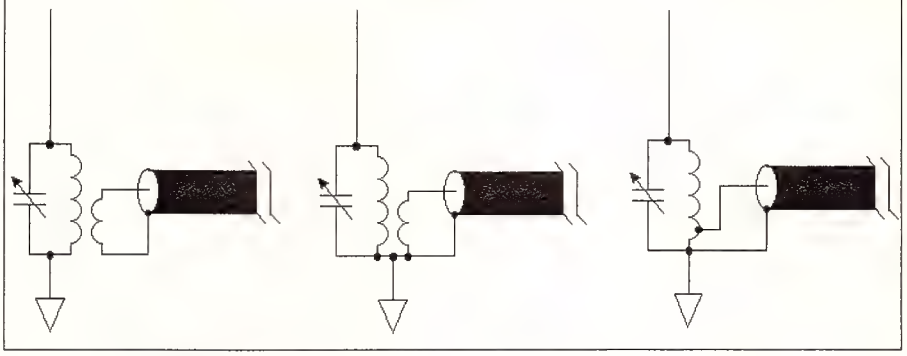
During a recent Field Day, we operated 2A-Battery QRP. We had several wire antennas at our disposal but I would like to give you the empirical results of an antenna test that I squeezed in.

On 20m I put up two resonant antennas with the following conditions:

1. End-fed vertical halfwave dipole with the bottom 91cm (three feet) from the ground; a link coupled parallel coil/capacitor circuit for impedance matching to coax; no radials or ground screen.
2. Centre-fed (via choke balun) horizontal halfwave dipole up about 6.5m (20ft) broadside north/south.
3. Same length of RG-58 feedline with losses measured at 1.1dB each.

Here are various methods of feeding an End-Fed Halfwave Antenna

(The return connection can be ground or just enough conductor to present a bit of stray capacitance)



4. The horizontal dipole was clear of support branches and foliage by a metre or so.
5. The vertical dipole was clear except that the top metre threaded into the foliage.
6. The antennas were cross-polarised and separated by at least one halfwave length, so mutual coupling should have been minimal.
7. Soil was probably average-to-good.

I have used a horizontal dipole at similar heights for many years at home and it has always been a very sure performer, Stateside and DX. I didn't expect any better performance without going to a more directional gain antenna or an increase in height.

"The end-fed halfwave antenna is nothing more then a resonant dipole antenna fed at the high voltage point (high-impedance end) instead of in the centre, which would be high current point (low impedance)"

I have used the end-fed-halfwave style of antenna for years during my portable excursions, it has always performed well, and I have never used radials with it.

My expectations were that the vertical dipole would perform better on stations greater than about 2000 miles and that the dipole would perform better on the shorter paths, especially since the peak of its major lobe would be straight up at that height.

I WAS INCORRECT

The end-fed halfwave (vertical dipole) routinely outperformed the horizontal dipole on 2000 miles paths by at least an estimated 6dB, except during very short periods of time when the signal would be predominantly horizontally polarised.

Mysteriously, there was not such a dramatic difference on DX signals, although the vertical was usually better. The dB delta was estimated by S-meter readings on a rig that I had measured to deflect about one S-unit every 4dB. The vertical dipole was often better by about two S-units so 6dB is probably a conservative figure.

Sporadic-E propagation was very prevalent during the field day and on 20m I was working stations at times only 150-200 miles away on skywave, yet the end-fed halfwave was still outperforming the horizontal dipole. I kept looking for something wrong with the horizontal dipole but could find nothing. What could go wrong with a dipole anyway? I admit this wasn't a purely scientific test but I believe it was a reasonable A/B test.

BOTTOM LINE

1. A vertical end-fed halfwave dipole outperformed the tried-and-true horizontal dipole at my field-day site, even though I would not have originally suspected that this would be the case.

2. Radials and a ground screen are not required but you may use them to gain that extra fraction of a dB *(LB Cebik, W4RNL) (QST, July 2000, pg38)* if it makes you feel better.

There is little current in a ground screen for this antenna until about 1/4 wavelength from the antenna axis, so make your ground screen big and carry lots of wire.

A ground screen may significantly detune the antenna from resonance since you will be placing a large conductive mass near its high impedance end.

If the antenna is not a resonant halfwave, more current will flow near the axis of the antenna, requiring a better ground screen.

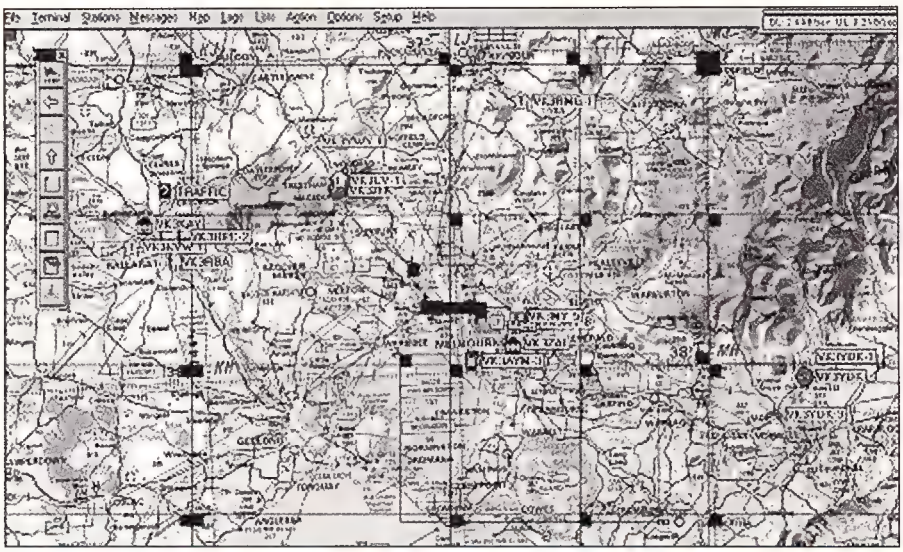
You may create your own problems.

3. I wish I could put one up at my house vertically.

We only made about 330 QSOs on CW (15/20/40m) and 240 QSOs on SSB (10/15/20/40m) for our solar-charged battery-operated QRP gear.

We could have made more but I spent a lot of CW operating time helping some new and potentially new hams with amateur radio and this was worth more "points" than the QSOs.

I did have one short rag chew with a station in Tokyo, Japan, using the end-fed vertical halfwave.



Exploring APRS with Kenwood's TM-D700A dual-bander

By **Neil Duncan** VK3ND

Just when we thought that amateur radio had given away too much ground to the capabilities of the Internet, along came APRS to remind us of the flexibility of our hobby.

WHAT IS APRS?

To be precise, it is the Automatic Packet/Position Reporting System devised and registered to one Bob Bruninga, WB4APR and the designers of Kenwood's TM-D700A know all about it.

APRS is a system originally designed to track mobile GPS stations equipped with two-way radio. The idea was to have a base station with a computer and a map on its screen – with an indication of the position of the various mobile stations.

The TM-D700A dual-band transceiver from Kenwood will do much more than just allow people to see where you are. While this latest generation of dual-band, VHF and UHF mobile FM transceiver offers full and comprehensive conventional dual-band FM operation, it also features a built-in TNC for a wide range of data communications options, including packet operation up to 9600 baud rates.

It also has APRS with the ability to send and receive messages and the TM-D700A will even work with SSTV images if you have Kenwood's VC-H1 plugged in.

While Kenwood dubs this radio the 'data communicator', I have dubbed it the 'steep-learning-curve device'.

LET'S SEE WHY.

First though, let's list some of the features offered by the TM-D700A. It has:

- Full 2m and 70cm FM transceive coverage.
- 118 - 1.3GHz receive with cellular blocked.
- Built-in 1200/9600bps TNC-compliant with AX.25 protocol.
- Full dual-band operation.
- Remote panel with the extension cable and panel holder supplied as standard.
- An extra-large (188 x 54 dots) backlit LCD and multifunction key display.
- A 9-pin terminal for PC connection.
- A GPS input terminal (NMEA-0183 compliant).
- A 9600bps PC-based packet communications for chat, BBS.
- An APRS system – and you don't even have to own a computer!
- A wide-band receive: 118-524MHz, 80-1300MHz (excluding cellular frequencies).
- Digipeat function capability.
- Dual receive capability on same band for voice and data. (Yep, listen to two frequencies simultaneously).
- An advanced Intercept Point selector (VHF band) for strong-signal-area work.
- 200 memory channels with 8-character memory name input.
- Two call channel memory capacity.
- Built-in CTCSS
- Digital coded squelch
- A programmable memory for selection and storage of five operation profiles.
- DX cluster monitoring (using the built-in TNC).
- AM/FM reception switch.
- 'Visual Band Scope 'for Visual Scan'.
- Mute function.
- 64-character international messaging system with Internet gateways.
- A backlit alphanumeric microphone for message input.
- Transmit power of 50 watts on 2m and 35 watts on 70cm with three selectable power levels.

The TM-D700A is unlike any other dual-band mobile radio Kenwood has ever produced. For a start, the control head is permanently detached and comes with remote cable, although I did note that the microphone must plug into the main unit so in some cases, a PG-X4 extension cable kit may also be needed. Mounting the rig is made very simple with the supplied bits and pieces.

The remote head is small, light and well presented. The almost total lack of annotation on its front face though, comes as a bit of a surprise, but when you switch it on you realise that the buttons work on the basis of the LCD information presented next to them, and this can change depending on your choice of operational mode.

THE BASIC OPERATION OF THE TM-D700A IS SIMPLE

The knob to the left changes frequency or channel and the two knobs on the right control the main or sub-band volume and squelch levels. By pressing one or other of the right-hand pair, you enable the left or right display as the main (transmit) channel and magically, you also make the corresponding frequency display digits larger (and the other area smaller). I found that to be a simple, elegant way of changing bands.

So, what is this comment I made about 'learning curve'?

It starts when you first twig to the fact that there are five transceiver modes. The VFO and MEMORY modes are familiar modes and need no comment. The MENU mode lets you select from an awesome range of things (SSTV colours, APRTS settings, clock setting - finally a radio with a clock! - and so on).

Would you believe there are five pages in the manual devoted to these menu settings! The two other transceive modes are APRS/PACKET modes and a thing called 'PM'.

'Programmable Memory mode' is where you select a heap of transceiver options and settings including mode, frequencies and so on, and store or recall any one of five such settings that you have cooked up earlier on.

When the review transceiver arrived at this shack, it was buried deep inside these preset modes and believe me, after switching on, it definitely took some time to unravel where I was.

Actually, it was worse than that - the little beast was sending packet messages from the moment I switched it on. Good thing I had the antenna connected.

Selecting a band is simple; just push one or other of the big buttons to the right. While there are six different combinations of 'main' and 'sub' band settings you can invoke, essentially the 144MHz ends up on the left side and 430MHz on the right. The extra complexity comes about when you remember that you can listen to the same band on both sides if you wish.

Thankfully the letters 'TX' will appear next to the band that will transmit when you next push the button and the letters 'CTRL' appear next to the display that is controlled by the VFO knob.

FLEXIBILITY AT A COST!

For conventional use as an FM transceiver, there is nothing lacking in the TM-D700A as far as I can see. You can select simplex or duplex, select offsets, shift direction or automatic offsets, reverse mode, odd splits, use memories, send tones, name memories with up to eight alpha-numeric characters or select a call channel for each band.

Scanning can be done from the VFO or the memories, or with a simple 'visual scan' screen where a bar chart indicates just who else is on the band.

The flexibility of the TM-D700A is certainly not in question!

Despite trying, I had to look up the manual to find out that rapid frequency change is accomplished by pushing the left button once and then turning it for major excursions. Push it again to reset that function - so simple!

The on-air audio reports I obtained with the TM-D700A were excellent and worthy of Kenwood standards.

On receive, I found the unit to be very good with only minor intrusions of pager noise and so on just below 148MHz - and only when I used the set in a high pager signal-strength area. The air-band, AM and general coverage reception seemed very good indeed.

The special modes supplied as standard with the TM-D700A separate it from the rest of the radio pack. Would you believe there is a second manual just to cover this little lot?

Specifications

- Receive: Wide-band receive: 118-524MHz, 800-1300MHz (excluding cellular), dual receive on same band for voice and data (two frequencies simultaneously)
- Modes: AM/FM
- Audio output: 2 watts or higher.
- Transmitter: 2m and 70cm coverage.
- Mode: FM
- Output power: 50/10/5 watts on 2m, 35/10/5 watts on 70cm.
- Memories: 200
- Power source: 13.8 volts +- 15%, up to 11.5A on transmit and 1.0A on receive.
- Dimensions (WHD): 140 x 40 x 195mm
- Weight: 1.2kg (main unit)

The radio bristles with PC-controllable goodies and to this end, it incorporates a 9-pin PC connection on the back panel for hook-up to your computer, plus a plug suiting a NMEA 0183-configured GPS receiver.

There are enough smarts in the TM-D700A to allowing full digipeater use, sufficient to set up a site wherever needed to help fill in APRS networks.

Full Internet gateway operation is also possible for worldwide text-based communication.

What if you do not want to buy anything more to plug into the TM-D700A, or you don't want to connect your computer to the rig? As far as APRS operation goes, if you know your current position, you can manually input latitude and longitude data for transmission in a beautifully configured set of screens, with the main knob acting as a kind of keyboard, selecting characters one at a time.

Provided you are happy with such a time-consuming scenario, you can send and receive messages at will. When you accept an incoming APRS message, the other station's latitude, longitude, direction distance and possibly, a message is all displayed for you. Not bad!

Yes, the transmission of position data can be accompanied by position comments (there are 15 selectable settings for this), and individual alpha messages of up to 64 characters can be sent without needing a keyboard.

A 'twist-the-knob-and-click' method of entering text is superbly implemented. An internal memory can store up to 16 pre-written transmitted/received messages.

Received APRS data can be stored in up to 40 memory channels for listing on the LCD display.

You can choose any one of them and see full details of the station's status, whether they are fixed or moving, their weather, as well as their position and heading.

Information about 'grid square location', transmission intervals, station details, digipeating capabilities, waypoint data, and so on can be built in, too.

I had a peek at a computer package that was connected to another suitably configured APRS radio and was amazed at what you can get on the screen. Full maps, zooming in from essentially a world map right down to an intrusive peek at your own suburb, complete with main streets - amazing! This dazzling software is inexpensive and can be purchased or downloaded as shareware.

I would love to have a go at the Kenwood SSTV device one day. The VC-H1 'Visual Communicator' has a camera built in. There is a display screen housed as a compact, battery-operated unit, and suits 'a majestic mountain panorama or just a self-portrait' according to the blurb.

Simply connect a VC-H1 to your TM-D700A/E to start sending and receiving colour images over the air. The trick would be to find someone with whom to communicate.

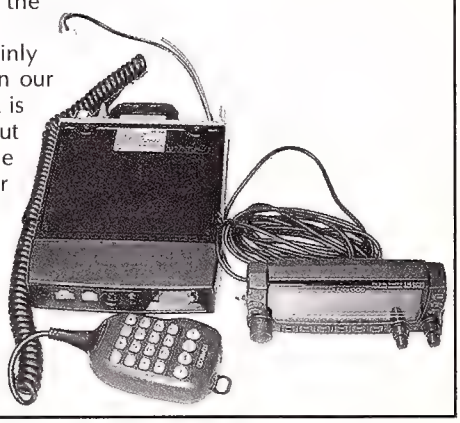
Nice one Kenwood.

The TM-D700A injects a new enthusiasm into FM mobile work. The people I saw in Ross Keogh's Strictly Ham shop in Bayswater were buzzing with enthusiasm about it.

On a long trip, such as to one of the popular country Ham-conventions, using APRS is a marvellous way of seeing where and how others are travelling. The number of stations that act as digipeaters around the place is quite stunning.

Using the TM-D700A in APRS mode certainly opens up a whole new set of horizons in our hobby,.but there is more - the TM-D700A is a superbly built, rugged and well laid out dual-band, general-coverage FM mode transceiver and stands out from others for its conventional operation alone.

Kenwood is to be congratulated for combining so many fascinating technologies into one small black box. I certainly gained a sense of achievement figuring out how to use it all (or most of it). We thank Ross very much for the loan of the review transceiver.



THE 27MHz DXer

By **Jack Haden** VK2GJH
Email: 27dx@usa.net Mailbag: PO Box 299 RYDE NSW 1680

There have been some very interesting DX paths from the east coast of Australia across the Indian Ocean to Africa. Signals from the many islands scattered through the Indian Ocean have been very strong with 173-SD-105 a good plus 10dB around 0530z one weekend. Quite a number were also chasing 187-SD/DX in Kenya who was very active among many other rare or semi-rare African DX stations.

Ascension Island (148)

Quite a few people are complaining about not receiving QSL cards from Johnny 148-IR/0 who has been quite active on the band. Johnny states that all mail from Ascension is first sent to St Helena Island by sea, then sorted and finally airlifted to the UK for further distribution. It's just a matter of being patient and biding your time!

Benin (183)

Those still needing Benin to add to their DXCC credits may like to mark on the calendar 183-RC/DX. The activity will commence on August 9 and conclude on August 31, or when 1000 contacts are amassed, whichever comes first I guess. split frequency may be utilised from time to time as conditions allow. QSL to Sylvain, PO Box 1, Chanceaux 37390, France.

Kenya (187)

At last report, Richard, signing as 187-SD/0, worked some 51 DXCC entities from Kenya. Richard mentioned that out of his 10 days on air some four days were very bad due to heavy fade and interference. In the Pacific, it was reported that Richard worked Australia, Japan and Indonesia; the majority of contacts took place with Europe.

Kiritimati Island (266)

Kiritimati is the indigenous Kiribati spelling of what we westerners know as Christmas Island, some 2110km south-east of Honolulu or 3,220km east of Tarawa, and the capital of Kiribati. The International Radio DX Group are planning a 2002 DXpedition with a team consisting of Paul 43-IR-259, Steve 163-IR-001 from Wales and Leon 43-IR-393. The pilot station on the Internet will be Matt 26-IR-021 in the UK More details will be published in due course.

Equatorial Guinea (199)

Reports from Martin 199-AT-101 indicate that the telecommunications authority in Equatorial Guinea is questioning his activities on 27MHz. As a result, Martin has elected to terminate all transmissions on the 11-metre band until further notice. There's no mention as to whether this too will affect the 199-PDS/AF-010 operation from Bioko Island, which is operating each weekend for the entire year.

Lars 13-IR-102

Lars 13-IR-102 informs the DX community that he is the QSL manager for a number of of DX calls. - 40-IR/DX, 40-IR/Multi, 111-IR/0, 111-IR-101, 113-IR-102, 113-IR-103, 123-IR-101, 146/13-IR-707, 177-IR/0, 188-IR-032 and 340-IR/0. Also Lars has been active himself from 30, 25, 40, 109, 155, 177, 329 and 330 prefixes oblique his home call. Requests for all of the mentioned calls go to Lars via PO Box 1410, Roth 91154, Germany. Return postage and SAE expected.

Sugar Papa DX

Abe 43-SP-001 has announced that QSL cards for his operation last year as 130-SD/DX should be on their way out as you read this. Those who sent twice will have their return postage refunded. Abe states that you must send a self-addressed envelope and at least one IRC or one greenstamp for return postage costs, no trimmings, no reply!

Please note no callsigns or club stamps etc are to be displayed on mail directed to Abe. He is also QSL manager for 75-SP/DX, 130-SP-101, 102 and 103 as well as 265-SP-101. QSL to PO Box 102, Traralgon VIC 3844.

WORLD DX FORUM

Disclaimer:

All times published are in the UTC/GMT format, QSL routes and IOTA designators are given where known. Information is derived from a number of sources in good faith and can possibly contain some inaccuracies and transcription errors beyond our control.

THE PACIFIC:

Australia is once again playing host to some IOTA activity with 43-SD/OC-136 reported from Churchill, Phillip and French Islands. This is a weekend only gig; the actual duration is unknown. QSL via PO Box 21, Isola, Rizza-Verona 37050, Italy.

Brett 43-SP-134 reports 43-TRC/OC-139 on Kangaroo Island at 0813z, QSL to Nasko 178-TRC-01.

Belau (Palau) has been about with 134-LD/DX quite active in recent weeks. Apparently, this is an IOTA operation from OC-009 and at 0234z they were a 5x5 with Peter 43-FP-103. QSL to PO Box 11092, Valencia 46006, Spain.

Central Kiribati is back on the DX trail once again, this time with Melody 265-SP-101 on Hull Island very active on 27MHz. Hull is part of the Phoenix Group and Melody plans to be on the island for the next 12 to 18 months. Don't expect a whopping signal from Melody as he is only running 12 watts to a dipole. Brett 43-SP-134 worked Melody at 0446z for a new country the other day, QSL to Abe 43-SP-001.

Eastern Kiribati received considerable attention from the windbags in Europe when 266-PIG-900 from Kiritimati Island was noted at 1000z. Before long a mini pile up was emerging with the usual European antics noted.

The **Federated States of Micronesia** will be active as 230-FAT/0 August 1-31 inclusive. QSL to Laurent at PO Box 63, Caudan-Cedex 56854, France.

Guam was active as 62-SD/OC-026 for the IOTA people during June, by Toshi 25-SD-104. QSL to PO Box 51, Suma Kobe 654-8791, Japan.

EUROPE

Aland Island was noted very weak in the noise at 0800z with 212/310-AT-102 barely readable with Peter 43-FP-103. He reported there was a rather large pile up of Europeans hyperventilating at the time.

Albania will be about in the period August 4-15 with Giovanni 1-AT-828 signing as 251/1-AT828. QSL to Giovanni at PO Box 24, Termine di Cassola 36067, Italy.

Andorra should be about the DX traps with two operations presumed to be on air now. The first is 51-RK/DX, which will close on December 31. QSL to PO Box 1, Espezel 11340, France. The other is 51-CAM/DX, which will close October31. QSL to PO Box 30, Muret 31601, France.

The **Azores Islands** proved to be a nice catch for Derrick 43-SD-108 when he secured Martins 75-AT-108 at 0215z with a 5x5 report exchanged. Activity has also been reported from 75-APD/DX in recent weeks, QSL to PO Box 1421 Ponta Delgada 9500, Azores Islands. Another to look for is 75-SP/DX active until 1000 contacts are made, QSL to Abe 43-SP-001 with the usual trimmings.

The **Balearic Islands** came through quite well around 0300z with Miguel 49-AT-109 a good 5x6 report with Peter 43-FP-103. There was little else about on the frequency at the time, except for the usual noise from Indonesia etc.

Estonia will be about August 1-31 as 304-SD/0, giving us a whole month to secure this one if needed. QSL to PO Box 15, Nasielsk 05-190, Poland.

The **Faroe Islands** generated considerable interest, especially from the IOTA chasers, when 52-AT/EU-018 appeared on air. Peter 43-FP-103 reported them a very weak 5x1 at 0844z working Europe. There were two people operating the station Erik and Olavur. QSL route not given.

Greece will be about in an IOTA capacity as 18-AT/EU-067 Andros Island and 18-AT/EU-067 Antiparos Island. Both will appear in the period August 1-31 inclusive. Cards for Andros Island go to PO Box 63501, Filothei 15202, Greece. The Antiparos cards go to PO Box 62110, Halandri 15210, Athens, Greece.

Hungary was due on air back around the July 14 as 109-MU/DX and will close once 1000 contacts are achieved. QSL to PO Box 2294, Burgos 09080, Spain.

Malta used to be a very rare DX catch in the not-so-distant past. These days however, there is an abundance of activity from this small island group. Derrick 43-SD-108 reports Joe 93-AT-141 at 0001z a fair 4x4 report via the long path.

Monaco burst through the noise at 1156z with Tim 107/14-HF-001 coming through a good 5x6. A few in the Pacific made it through but the going was tough due to deliberate interference being generated. Tim faded out around 1222z when he was giving out his QSL address, which I missed. You may also like to look for 107/1-AT-1059 active August 4-15, QSL to PO Box 27, Trofarello 10028, Italy.

Romania came through quite well at 0900z with Aurel 233-FR-101 a good 5x6 to Milo 43-MV-01 but was subject to heavy fade. QSL route not known,

Sardinia will commence operation on August 4 as 165-WD/DX and close down on August19. QSL cards go to PO Box 65, Rufina 50065, Firenze, Italy.

AFRICA & INDIAN OCEAN

Algeria proved to be quite popular with Robert 146-LD-101 among a throng of excited Europeans at 0706z. Robert was weak and seemed to be preoccupied with EU despite some Australian stations frantically calling him. Someone mentioned that Rafy 146-DZ-103 was also about although I did not hear him. Despite rumours to the contrary, Rafy does QSL although he is very slow.

Angola aroused considerable interest in the Pacific when at 0800z a pile up of Europeans were noted working a very weak Raymundo, 39-SA-101, who was barely audible in Sydney.

Ascension Island will be about as 148-AT/0 August 8-14. QSL to PO Box 59, Asti (AT) 14100, Italy.

Benin is scheduled for activity as 183/14-RSI-015 and 183-RC/DX in the period August 9-31 inclusive. QSL both via PO Box 01, Chanceaux (CH) 37390, France.

Burkina Faso has been reported about the DX traps with Hippolyte 170-CF-110 reasonably active in recent weeks. The other Sunday evening Hippolyte was a readable 5x3 in Sydney around 0700z.

The **Cape Verde Islands** will be about in an IOTA capacity with 205-SD/AF-086 Sao Vincente Island in the period August 1-31 inclusive. QSL to PO Box 753, Las Palmas 35080, Canary Islands, Spain.

Christmas Island appeared on the band around 0455z with Dave 217-SD-101 heard chatting to some Europeans. Dave was a rather poor 3x2 at best in Sydney; the usual incessant chatter from nearby Indonesia knocked his signal about.

Djibouti presented a rather nice 5x8 signal on the band at 0720z with Patrick 186-AT-105 attracting considerable attention. It wasn't long before the lung-busters

Laccadive Islands (149)

Mathias 13-TRC-021 headed to the Indian Ocean via India to activate the Laccadive Islands as 149-TRC/0 in the period March 28 to April 3. The journey was not without incidents, the first being the numerous conmen and touts who hang about Mumbai International Airport in India. Even the porters were all on the "take" with Mathias having to tip, in the most sought-after American dollars, nearly every person he met.

After a night's transit in a sub-standard hotel, it was off to Cochin in the state of Kerala from where the flight to the Laccadives departs. Mathias found the people of Kerala to be the opposite of those in the overcrowded Mumbai. After an overnight stop, Mathias was ready for the Indian Airlines flight to Agatti Island in the Laccadives group.

The aircraft was very small with a 10kg luggage limit enforced for each passenger, with only four passengers travelling on the flight. Contents of all luggage underwent a security check prior to boarding where the official enquired about the assorted electronic items in the baggage. Mathias told the fellow it was part of his shortwave radio station for listening only; this explanation appeared to satisfy the official.

The flight departed for the 90-minute trip to Agatti in the Laccadives where Mathias was transferred to a waiting boat to take him to his final destination of Bangaram Island. After a further 90 minutes in the boat he was greeted by the resort manager, a Mr. Cherry, of Bangaram Island and transferred to his accommodation, a small but well appointed hut.

Quite a number of British and German tourists were staying at the small resort and Mathias erected his antennas, a monoband dipole for 27MHz and a Santiago 1200 vertical. Aided by a ladder the dipole was attached to a coconut palm and after 20 minutes Mathias was ready to come on air. A couple of resort workers asked if he was operating a "pirate station" which Mathias denied and stated it was for SWL only, no transmitting!

A total of 184 contacts were worked on the first day of operation. The next day the European couple in the hut next door commented they could hear him talking on the radio during the night and asked if he was a "pirate radio" operator. Mathias had no real option but to confirm this; they didn't seem worried.

Mathias nearly broke out into a cold sweat when a police helicopter landed at the resort on the second day. Two police officers walked around the resort and noticed the antenna but didn't investigate it any further. The police stayed on the island for two days and Mathias decided to stay off the air while they were around. It turned out that the police were just conducting a security-check visit and nothing more.

In his final days Mathias made about 200 contacts a day with propagation ranging from very good to dismal. Other time was spent enjoying the resort facilities and other activities, with snorkeling in the lagoon being a favourite pastime.

A total of 898 contacts were made to 43 DXCC entities, in our region; Australia, Indonesia, Thailand, New Caledonia and Western Kiribati were worked. Most of the other contacts were with Europe and Central/South America and the Caribbean.

in Europe got the scent and before long, a very ugly pile up developed. Seven Brothers Island was also to be activated in June as 186-AT/AF-059 for the IOTA chasers, QSL to PO Box 62, Brest-Cedex 29266, France.

Egypt should have been around in the period July 14-18 as 117/13-AT-444. QSL to PO Box 1244, Bexbach 66443, Germany.

Eritrea is needed by many on 27MHz so you may like to keep on the alert for 333/13-AT-444 scheduled for activity July 19-24. QSL to PO Box 1244, Bexbach 66443, Germany.

Liberia is a rather difficult one for the Pacific so I was rather surprised to hear 42-RB-001 a good 5x6 at 0708z. However, there were a number of people claiming that this one is in fact a slim and not the real McCoy, work now and worry later.

Kenya has been reported by a number of contributors with 187-SD/DX being heard/worked in Australia. However, many appear confused about the QSL route, which is via Gert 19-SD-141 and not John 19-AT-400.

The **Madeira Islands** was coming through quite well the other day with Derrick 43-SD-108 nabbing Akalvin 119-AT-014 at 2235z 5x5 report. Derrick also reports working Donato 119-CM-157 at 2230z with a 5x4 report.

Madagascar came through quite well the other day with Anja 188-IR-032 going full steam ahead in the IR Contest. At last report he had worked 41-IR-198, 43-AT-143, 43-SD-004 and 43-IR-652 in this part of the world.

Mauritania created considerable activity among the DX community with many both hearing and working 66-UD/DX. However, the victory and elation for many proved to be short-lived. A press statement circulated on the Internet by the UDX Radio Group HQ in Europe stated that 66-UD/DX was a slim. Milo 43-MV-01 reported it 5x4 at 0645z being deliberately jammed.

Mauritius has been quite active with many linking up with Olivier 168-OR/0 in recent weeks. At 0630z Olivier was a good 5x8 in Sydney and looking for the Pacific at the time. QSL to PO Box 59, Cusset-Cedex 03303, France.

Nigeria presented a rather lucky catch for Mark 43-ACT-01 in the ACT at 0710z working Paul 89-ST-01. Although Paul was only a 5x2 at the time it was sufficient for a good solid two way contact.

Rwanda proved to be another nice catch for Mark 43-ACT-01 when he bagged Giorgio 227-AT/DX 5x3 at 0700z the other Sunday. Due to problems with stations in Europe refusing to do as they were told Mark wasn't 100% sure if he made it through or not.

Senegal should commence operations as 64-SD/0 on the July 29 and close on August 10. QSL to PO Box 9298, Tilburg 5000-HG, The Netherlands.

Sri Lanka will be about as 177-SD/0 from the July 30 to August18. QSL via PO Box 100153, Pirna 01781, Italy.

Sudan should be about in the period July 25-27as 160/13-AT-444 with cards going to PO Box 1244, Bexbach 66443, Germany.

Swaziland surged out of the noise at 0555z with Charlie signing as 191-SZD/DX. Despite being just a 4x2 at the very most Charlie had a number of Australian stations in hot pursuit. Many in Europe were moaning about the USD$2.00 Charlie is requesting for QSLing. It appears Charlie used to be 44-AT-155 who had a rather seedy reputation at the time, so be warned.

South Africa has been about with a few different operators noted on the band in our late afternoon-early evening time slot. Milo 43-MV-01 reported Don 44-DB-101 and Gert 44-SD-101, both up around the 5x7 mark but subject to fade.

Tunisia will be about in August as 147-AT/AF-083, an IOTA operation from Djerba Island. The period of operation is reported to be August 16-23. QSL to William at 50 Rue Royale, Chaffois 25300, France. Split frequency may be used when required.

Uganda has been very active around the various DX spots with 174-FAT/0 active plus additional activity reported from Gianni 174-MSF. Gianni was heard reasonably well in Sydney around sunset, a good 5x6 report. Gianni requests that QSL cards go to PO Box 219, Moyo, Uganda.

ASIA/MIDDLE EAST

India should have been about during June with Hein 57-AC/0 or 57-AC/DX reported to be active for a couple of weeks at least. Brett 43-SP-134 reports working Hein as 57-AC-004 at 0058z on June 9 with a reasonable signal. QSL to PO Box 2107, Helmond 5700-DA, The Netherlands.

Kazakhstan came through quite well at 0535z with Alex 308-PAS-101 meeting up with Derrick 43-SD-108. Derrick reported Alex a poor 2x3 report, a borderline contact at best.

Kuwait was about the DX circuit at 0702z with Hamad 102-SD-011 a good 5x6 in Sydney. There weren't too many takers to his calls and Hamad ended up working some Philippine stations.

Turkey has been quite active with 116-FRI/SAK reported by a number of contributors. The operation took place from Sakharya, QSL to PO Box 2, Chassieu-Cedex 69682, France.

Uzbekistan powered through the crud at 0645z with Mark 43-ACT-01 reporting Ali 316-MJ-101 a good 5x9. QSL via Claude at PO Box 1, Sakkmara 461430, Russia.

LATIN AMERICA/CARIBBEAN

The **Dominican Republic** came through quite well at 0640z with Derrick 43-SD-108 working Josefe 37-KP-010. With the band starting to close to the Caribbean Josefe was still a readable 5x3 at the time.

Grenada was attracting considerable attention at 0100z with 195-SD/000 a good 5x6 with Mark 43-ACT-01 near Canberra. Mark also noted Paulo 195-PR-010 a little later at 0145z 5x4 report.

Guatemala should be on air as you read this with 72-PAS/DX closing on October 31. QSL to PO Box 422, Oviedo 33080, Spain.

Montserrat in the West Indies came through very well with Gavin 43/26-GB-102 reporting Frankie 157-AT-101 5x3 at 2233z. There hasn't been a lot of activity out of Monserrat since the volcanic eruption some time ago.

Saint Marten has been quite active with Ronny 166-AT-101 heard the other weekend at 2300z a good 5x6. Also noted during the week was 166-RR-102 at 0132z 5x8 report, plus 166-AT/NA-145 an IOTA operation on Saba Island at 2236z 5x5 reported by Evan 43-EW-01.

St Kitts & Nevis proved to be a nice catch for Derrick 43-SD-108 when he linked up with Trevor 283-AT-101 at 0240z. The signal from Trevor was a workable 4x3, better than nothing as they say.

Suriname presented a good 5x8 signal from Reggie 73-IR-315 the other day around 2245z. Moments later Alain 73-AR-001 was also noted with a good 5x9 plus signal.

Trinidad & Tobago came through very well at 2345z with Karl 158-IR-101 a steady 5x8. Also noted by Allen 43-AR-09 was Ajac 158-AP-101 a few channels up, also a good 5x8.

FUTURE ACTIVITY...

Aland Island 212-SD/DX soon; Albania 251-FGB/0 soon; Angola 39-RS/0 soon; Bermuda 123/35-AT-130 March to November inclusive; Canary Islands 34-AT/LM La Matanza September 22,23; Fiji 99-FAT/OC-016 Viti Levu Island September 1; Guernsey Island 169-AT/EU-114 September 7-9, Rodi Dodecanese 59-AT/EU-001 Kos Island September 12-26; Macedonia 332-FGB/0 soon; Rotuma 325-TD/DX soon; 325-WD/DX soon; Singapore 98-SD/0 December 5-20; St Kitts & Nevis 283-DT/0 soon; South Cook Island 250-SD/0 November 13-27; Ukraine 315-WD/DX soon; Western Sahara 300-IR/0 soon.

EPILOGUE

A very productive month it's been. As usual, special thanks go to the following contributors for sharing their news with us: Derrick 43-SD-108, Milo 43-MV-01, Brett 43-SP-134, Gavin 43/26-GB-102, Allen 43-AR-09, Peter 43-FP-103, Mark 43-ACT-01 and Evan 43-EW-01.

Reports can be sent via email to 27dx@usa.net or by post to PO Box 299, Ryde NSW 1680. You must send a SAE and 45-cent stamp for a personal reply.

Catch you all next month.

73 de Jack

27MHz Viewpoint, too much nonsense?

By **Jack Haden** VK2GJH

There appears to be a growing number of CB operators who are displeased with the increased activity generated on the band by non-DXCC operations. Many in Europe and the USA are complaining loudly about the large number of Special Event Stations and the IOTA/Inland Waterways Islands operations clogging the band. Not forgetting the ever-increasing Regional and Provincial activities emanating from the continent that enjoy little popularity elsewhere, but are very much audible all over the world when the band is wide open.

Debate has been raging, both on air and over the Internet concerning this topic and from my observations there's a popular consensus that the majority despise these operations. The "against" argument clearly comes from those who just like to have a chat with mates overseas or work some DXCC entities.

So, what can we do about it? Very little I would expect, however, there must be some demand for these operations, otherwise they wouldn't keep coming on air. They may be appreciated in Europe where the majority originate from, but they gain very little favour elsewhere it seems.

Dave from the U.K who signs as 26-AT-356 sums up the general feeling among the DX community: "Let's be honest, some 95% of activations on 27MHz these days are of no real interest to a lot of people and are seen as more of a "business opportunity" by people like myself.

I would go so far as to say that 11 would be a much better place to be if some (not all) of these rather dubious activities were not all over the frequencies that I and my pals like to use on a daily basis.

"I reckon I spend more time trying to find a clear frequency these days that I spend talking to people. For example, who, in the majority of cases, needs to work "Department 43 in France", or the "800th Anniversary of Riga" or some SES calling itself "Waterfall of Hohwald in France" (14-FAT/CDH) etc?

The lists are never ending and nearly all request an American dollar for their QSL card." Gerry 2-GC-101 in California also adds his 10 pence worth: "I am getting rather fed up with some of the crap "dollar dazzlers" that seem to be spreading like some rampant disease across the 27MHz band. Most of this trash appears to be coming out of Europe with any old excuse to come up on with a fancy callsign and scream "QRZ" until they are blue in the face. The other day I was talking to my mate in Australia when some idiot in Spain just jumped onto the frequency screeching "CQ CQ 30-SD/GR Granada Province" repeatedly. He deliberately ignored my request to move as the frequency was already in use.

Don't tell me this dork didn't hear me either, as I run big power here! We moved up the band only to be trounced by another junk box operation, this time "14-IF/FA Department-76 France" and like his mate was "QRZing" himself to death.

These nickel and dime stations show zero respect for others on the band, little wonder that radio rage is on the increase right across 27MHz!"

Warren 43-WT-100 in northern NSW says: "What a mess the band has become in the past few years.

I tried to speak with my brother Jock 108-JT-101 in Scotland the other night and couldn't find a clear frequency! Every time the band is open to Europe, we are deluged by what I call "nonsense callsigns" from one end of the band to the other.

I don't know anyone in Australia who chases this drivel. Nothing important mind you, just take 1-RB/J2000 for example, or 14-FGB/PVP? What's the credibility of these operations? You tell me and we'll both know. Just 27MHz pollution, that's what they really are, and we complain about the Indonesians.

The Indonesians have nothing on that lot out of Europe, it's only made me more determined to go for my amateur licence."

So what can I say? As the battle for a clear channel becomes more difficult, people just lose patience and that's when radio rage enters the arena.

As a matter of interest, for the month of June I counted some 48 non-DXCC/IOTA activations listed in various DX publications out of Europe alone. Those special callsigns, you either love them or hate them and the way things are, they're not going to go away overnight.

VALE: Mr Ken McDonald

It is with much sadness that we announce to CB Radio operators throughout Australia, the Death of ACBRO's Founder Mr Ken McDonald. Ken Died here in Adelaide on the 8th of June, after suffering a long illness. Many will remember Ken as the Rebel Rouser 13 or the Pioneer Radio 600.

Ken will be remembered by CB radio operators through out Australia, for his wonderful contribution to the CB Radio cause. Ken was responsible for the promotion of the Pioneer Radio Club of which members are scattered all over Australia, this club will still be in operation for many years to come.

Ken was also one of the founders of ACBRO, who travelled through out Australia back 20 years ago promoting ACBRO, and fighting the Federal government which at that time was trying to close 27Megs to the CB community. Ken always said that one of the things he was most proud of, was that he got the Australian Labour Party who were in opposition at the time, to put together a CB Radio policy favouring the 27Meg CB Band always being kept for us Cbers.

I being an old time CBer for more than 20 years, remember, the Ken McDonald of old, he filled a big hall here in Adelaide with people, on the night ACBRO was formed we at ACBRO started that night with over 100 paid up members thanks to Ken, who had the gift of the gab with people when he was talking to people no matter who they were he made them feel important, he had time for everyone and they had time for him.

We here at ACBRO will continue the work that Ken started 21Years ago we have the same belief, we believe that the people of Australia need and deserve a Citizens Band Radio Service.

Wayne Winston Secretary ACBRO

John Batty is back with some more

SHORTWAVE LISTENING WITH A DIFFERENCE

Jindalee Over-The-Horizon Radar is possibly audible ... over the horizon. Intrepid Kiwi monitor Ian Julian reports hearing "a high-powered single-pitched tone here daily on 31.000MHz. Often thought it was coming from Asia, but after some recent investigation it appears to be one of the Australian Defence Jindalee frequencies (25.100, 31.000, 33.200, 40.200, 43.985MHz)." Apparently, the signal is present when propagation favours Australian signals, and can be heard when there is no Asian propagation at all. Some possibly interesting frequencies sent in by our old friend A. Nonymous: NASA (Australia), 6981kHz; Pine Gap, 6995, 7460, 9365, 11517.5, 13413.5, 16057, 17415, 18065, 19983 kHz.

UN Mission East Timor: 7797, 9992kHz. If anyone hears anything, let me know. Thanks, A!

Another interesting item from A. Nonymous: "Hi John, I was listening to the RAN A4 freq last night (damn busy), and heard a weird one at 1233z. " Darwin control this is patrol boat Micronesia, A4, A4, one immediate over".

PB Micronesia was unable to get in contact with Darwin control, and tried several radio checks with them but only attracted their attention once when they were referred to as an unknown station, and unreadable.

At the same time, they were clear as a bell - 5x7 to me in Melbourne, (maybe I should offer my QTH as a receiving station for the RAN COC's network).

I find this one weird, because it is not the normal thing for foreign ships to be using RAN comms facilities. (I heard the FGS Gorch Foch, A-60, having the same trouble a couple of years back - JB). The only possibility that I could offer would be that the PB Micronesia is one of the Pacific class PCs that we built for a number of the Pacific countries, and is returning to Australia for a refit - I guess the 'immediate' referred to was either a locator or a wx report.

I've mentioned propagation markers before. I know Ary won't mind me repeating his message which originally appeared on WUN, as it's useful to us all; "10145.5kHz, HB9TC. Propagation Beacon SUI "HB9TC BEACON INFO WWW.QSL.NET" followed by 24 dashes CW, copied 16-05-2001, 1648z" - (Ary Boender).

The new propagation marker HB9TC has a Website where you can fill in a report form: http://www.qsl.net/hb9tc/ An e-mail message with an attached picture of the equipment arrived within an hour. WUN is the Worldwide UTE News mailing list. WUN is a non-profit, dues-free club established in 1995 to share information on shortwave utilities. For more information: http://www.wunclub.com Write to listmaster@wunclub.com if you need assistance with the mailing list.

3735kHz:

0930z SOUTH EAST VICTORIA SES conducting radio checks. (AI)

5696kHz:

0801z CAMSLANT calling RESCUE 177 to confirm position and ETA. (AI)

1002z COAST GUARD POINT REYES calling COAST GUARD 6017 for radio check. Loud and clear. (AI)

1003z CAMSLANT calling 1717 to confirm current position. (AI)

1020z RESCUE 1603 calling CAMSPAC for radio check. Loud and clear. (AI)

1040z RESCUE 1720 calling CAMSLANT with routine check-in. (AI)

1115z CAMSLANT calling 2141 for radiocheck with no joy. (AI)

1116z CAMSLANT calling 2135 to confirm position details. (AI)

7612kHz:

1000z ZERO ALHPA calling ZERO BRAVO for radio check. (AI)

8122kHz:

1045z LZF calling CANBERRA CONTROL with receipt of traffic. (AI)

0835z CANBERRA CONTROL calling 141 to resend traffic twice. (AI)

0945z CANBERRA CONTROL calling CANBERRA (FFG) "have you printability 4, send your traffic twice." (AI)

0739z FREMANTLE calling CANBERRA CONTROL with priority traffic ship-shore. (AI)

0849z DARWIN CONTROL calling 10R "you did not phase, have constant marker." (AI)

1046z CANBERRA calling EXMOUTH CONTROL to confirm availability of 12MHz. (AI)

1102z CANBERRA calling EXMOUTH CONTROL, "Stop sending, your key has dropped out." (AI)

0610z BENDIGO calling CANBERRA CONTROL with priority traffic passed by voice. (AI)

0838z NORMAN calling CANBERRA CONTROL to confirm receipt of traffic. (AI)

1114z DARWIN CONTROL calling WARRAMUNGA (ANZAC FRIGATE) "passed your last to CALLSIGN CANBERRA CONTROL, over." (AI)

1237z 3UR calling CANBERRA CONTROL requesting they relay message for them. (AI)

1047z DUBBO calling EXMOUTH CONTROL to send more test tapes. (AI)

8294kHz:

1057z Station in Fort Lauderdale talking with other stations regarding weather and safe anchorages between Santiago and Cuba. I reckon they were fishermen as they were referring to different trawl depths. (CLP)

1103z Station called in with departure information (unable to ID). (CLP)

8316.5kHz:

0450z PN9 calling ZFI "received your testers strength 4, over." (AI)

0525z NAVY AUCKLAND calling BAB to send traffic 15MHz. (AI)

0308z 30H calling NAVY AUCKLAND to stop sending traffic. (AI)

1037z IZM calling NAVY AUCKLAND to resend traffic. (AI)

1246z FKR calling NAVY AUCKLAND to send traffic again. (AI)

0521z VRE calling NAVY AUCKLAND to send traffic. (AI)

8971kHz:

0937z BLUESTAR calling MONGOOSE "Roger, will be standing by." (AI)

0943z MONGOOSE 04 calling BLUESTAR with dispatch details. (AI)

0944z MONGOOSE 03 calling BLUESTAR to go to 101 for radio check. Any idea what freq this might be? (AI) (Nope; if it was Foxtrot 101, that would be a MYSTIC STAR freq (12106kHz), but this is a USN net, not MYSTIC STAR. Anyone?)

0955z BLUESTAR calling ECHO to confirm course and speed. (AI)

0853z BLUESTAR calling MONGOOSE 09 to go green, followed by ANDVT bursts. (AI)

0859z BLUESTAR calling MONGOOSE 09 "You are very hard to copy in the red, over." (AI)

8974kHz:

0400z SAVAGE 03 calling AIRFORCE SYDNEY requesting TTF for YPDN. (Edinburgh) (AI)

0938z STALLION 001 calling AIRFORCE DARWIN with revised ETA details. (AI)

0520z ORION 02 calling AIRFORCE AUKLAND with arrival details. (AI)

2340z AIRFORCE SYDNEY calling SEALION 635, to go to 11250kHz. (AI)

0205z WOMBAT 028 calling AIRFORCE PERTH with position details. (AI)

0045z HUDSON 24 calling AIRFORCE AUKLAND requesting TAF for YMEN (Essendon), YMES (East Sale), YFLS (Flinders Island). (AI)

0050z AIRFORCE toWNSVILLE calling AUSSIE 101 to go to CHARLIE DELTA 1. (AI)

0848z AIRFORCE DARWIN calling AUSSIE 660 with TTF for YPPH (Perth) and YPEA (Pearce). (AI)

2335z AIRFORCE SYDNEY calling REACH 5E1 to go to 9007kHz. (AI)

8992kHz:

0925z HUDSON 612 calling AIRFORCE TOWNSVILLE with P/P re refueling. (AI)

9007kHz:

0605z SHEPHERD 630 calling AIRFORCE SYDNEY for P/P to 92 WING OPS. (AI)

2341z AIRFORCE SYDNEY calling REACH

5E1 with WX for YMRI (Richmond). (Al)

9031kHz:

0540z Australian male voice, "This is ALPHA 14, radio check, over". (Al)

11175kHz:

0625z Puerto Rico with radio check. Andrews AFB responded they were copy 5. (CLP)

0633z Kadena with weather information to '36158'. (CLP)

0638z 36158 advised Kadena they had 104 marines onboard. (CLP)

0639z traffic interrupted with EAM from Andrews. (CLP)

0647z Reach 4068 calling, was eventually answered by Puerto Rico, who advised they would relay the flight information received. (CLP)

0950z MAC 129 calling ANDERSON with ETA update. (Al) (Whoa! Delayed Echoes! Military Airlift Command has been extinct for years!)

0956z ECHO 01 calling HICKAM with cargo details. (Al)

1042z YB-803 calling HICKAM for P/P to OPS STATION. (Al) (This would have been a P-3C from VP-1 "Screaming Eagles", NAS Whidbey Island.)

10432kHz:

0430z Coastwatch aircraft LIMA 37 to CHARLIE MIKE, with details of MV ALYSSAM with 7 POB, from Hong Kong, with ETA Cairns 0100z. (This could have been one of the Brittain Norman Islanders (from the background noise I heard) on patrol out of Cairns). (CLP)

14428kHz:

1035z CSSD this is BSSG "In the plain radio check", CSSD responded, and BSSG asked them to bring E7L on 'this net'. All voices US accent. (CLP)

(This net appeared once Tandem Thrust finished on 7942kHz. Both Ian Julian and myself were following the sigs when we could, which were S9 in Nanango during the day but fading at night, and weak during the day in NZ and strengthening at night.

The sigs originated from three static USMC units, CSSD [Combat Services Support Detachment], which seemed to have stations in both Rockhampton and Shoalwater Bay, and BSSG Gladstone.

Occasional mobile stations were also heard, such as E7L, a five-tonne truck broken down between Gladstone and Rockhampton.

Other trigraph callsigns on the net, mixed with a use of surnames, seemed to indicate that the callsigns were made up of the rank and initials of individuals (eg E7Mendez). The net seemed to be set up to co-ordinate collection, repair and transshipment of Marine Corps stores and vehicles post-exercise.

Some of the personnel were evidently (and self-admittedly) not trained to a high standard of radio procedure - some sounded like storemen, some like mechanics etc - and some of the banter on the net, and comments of exasperated senior NCOs and line officers was hilarious. JB)

1038z CSSD this is BSSG in the plain over ... this was continually repeated. (CLP) (At one point on 7942kHz, one of these long calling periods I heard ended with contact being made and a frustrated Gunnery Sergeant asking: "Why is it I gotta call you guys so many times?" "Sorry, Gunny, what was that, say again over" ... "Why do I have to call you people so many times ... this net is supposed to be manned 24/7". "Sorry, Gunny, we, uh, just stepped out ... looking for those radios you mentioned" ... "How come ... I've got the radios here ..." (JB))

1040z CSSD this is BSSG "I need to confirm times on IMASAT 14 over ..." (CLP) (This may have been one of the INMARSAT satellites, although what the 14 refers to I don't know. A couple of references were heard on HF to "SATCOM checks", but nothing was heard on the regular satellites. If they were using INMARSAT, that would explain it. (JB))

1041z "2D is going to G6 at this time" (CLP)

1043z CSSD was asked if 7L was available, BSSG was advised he was not and would speak with them on the phone. (CLP)

1044z CSSD was 'stepped on' by BSSG when CSSD requested information on when the personnel and equipment would be available. They were advised it would be a couple of days before 'division can supply'. BSSG then advised CSSD to only use IMASAT (INMARSAT?) in case of an emergency, as the costs were high, and they advised them to collect 'Kangaroo Furs' to pay the IMASAT bill. (CLP) (Beats blowing emus away) JB)

1049z CSSD called BSSG requesting the time the person departed, and was advised he departed in a HumVee and that only one vehicle had departed when two were required the next day. (CLP)

1053z BSSG advised that two vehicles had departed at 1845 with seven personnel. (CLP)

1058z BSSG requested from CSSD the combination to "Evergreen on Quanton", when asked why they responded, "So we can take the lock off". CSSD advised they would contact via satcom. (CLP)

1101z CSSD to BSSG "waiting on Satcom". (CLP)

1104z BSSG to CSSD, unable contact on satcom. CSSD responded 'we can hear you.' (CLP)

1107z CSSD to BSSG, requesting they check their times available on the bird. (CLP)

1111z Finally CSSD gave BSSG the combination of 403xxx, as satcom failed. (CLP)

31.100MHz:

2210z TOWNSHEND ISLAND: "TOWNSHEND ISLAND MOBILE this is TOWNSHEND ISLAND ... TOWNSHEND ISLAND MOBILE this is TOWNSHEND ISLAND ... TOWNSHEND ISLAND nothing heard out." (IJ)

2236z "This is TOWNSHEND ISLAND we don't have comms with the ship GERMANTOWN (LSD-42) over ... Roger that's a solid copy out." (IJ)

31.200MHz:

0044z Tandem Thrust again - looks like the snakes, at least, thought it was a great idea; "Two three four five, more to follow over ... send over ... Bravo stop ... more to follow over ... send over ... Echo stop; snakebite to lower right arm ... Foxtrot stop; Requires CASEVAC over ... This is ZERO ALPHA, roger over ... ZERO ALPHA over ... FIVE ONE CHARLIE ... ZERO ALPHA ... ETA for the CASEVAC, what's it going to be for the CASEVAC over ... ETA for the CASEVAC, figures one zero mikes ... where you want it, over ... FIVE ONE CHARLIE roger ... Do you have an appropriate area over ... Roger ZERO ALPHA standing by ... This is PAPA LIMA, I don't want to give her a debrief over the radio as it would take too long, can you please debrief her on the proper ways to send a CASEVAC over." (IJ)

32.050MHz:

0005z CAVALIER 488: Aust Army helo Exercise Tandem Thrust with "CAVALIER FOUR EIGHT EIGHT ... Seven nine six feature." (IJ)

0430z DIAMOND (Landing Pad) and ALPHA 11 (Aust Army helo): mixing in with Asian comms with "South ... west ... ALPHA ONE ONE this is DIAMOND, you're unreadable, climb for better radio comms ... DIAMOND this is ALPHA ONE ONE." (IJ)

2325z "ALPHA ONE ONE, two by FOXTROT SEVENS operating in the vicinity of Solvent, the radius of Solvent is unknown, surface to flight level one two zero ... DIAMOND, this is ALPHA ONE ONE, we have no reference to that, all we have is a C130 and fast movers ... ALPHA ONE ONE, tracking Skuuma then Wannabe ... ALPHA ONE ONE this is DIAMOND, report Alpha nine at Wannabe ... Wilco ALPHA ONE ONE ... BRAVO TWENTY, ONE ALPHA, DIAMOND ... This is BRAVO TWO ONE ALPHA, ALPHA ONE ONE is abeam George, tracking to ... for Alpha nine ... Copy ALPHA ONE ONE thanks." (IJ)

32.225MHz:

2230z COOKHOUSE and SPADE: Aust Army Exercise Tandem Thrust FAC? Net. Mixing in with local QRM on the freq with "This is COOKHOUSE, DIAMOND is unable to go between SPADE ... COOKHOUSE, COOKHOUSE this is SPADE ... FALCON ... co-ordination when we move ... DIAMOND this is COOKHOUSE ... It's making it difficult re tracking that's why we're remaining on dual frequencies." (IJ)

2246z with "EPIC ONE TWO is approaching ... A/C BLACKHAWK TWO ONE FOUR ... roger that, try to get the frequency ... COOKHOUSE did you copy that." (IJ)

33.350MHz:

2346z CAVALIER 488 and DPRAC: Aust Army Safety Net SWBTA Rockhampton Sector West with "This is DPRAC, say again all after seven and all before seven nine six feature over ... CAVALIER FOUR EIGHT EIGHT tracking via point Skuuma for the seven nine six feature over ... This is DPRAC, roger, I will pass this message onto DIAMOND for you over ... CAVALIER FOUR EIGHT EIGHT many thanks, out ... CAVALIER FOUR EIGHT EIGHT this is DPRAC, passed your message over ... CAVALIER FOUR EIGHT EIGHT, many thanks, over ... DPRAC, roger out." (IJ)

34.500MHz:

2349z COOKHOUSE and DPRAC: DPRAC Net Primary Northern and Eastern Sector of SWBTA. "Roger over, how me over ... DPRAC, I have you loud and clear

also ... COOKHOUSE out." (IJ)

38.100MHz:

0005z Indo-Chinese Military, Possibly Thai, with continuous voice bursts and raspy audio. (IJ)

Thanks once again, you keen-eared lot. Please don't get upset or stop sending logs if you don't see yours listed! I only get so much space a month, and I will get around to all of them eventually. While we're on the subject, this is only one of my jobs (I spend a lot of time away from both radios and computer); while I answer bucket loads of e-mail most months, sometimes, snail-mail letters get lost in the flood of e-mails and I accidentally neglect to answer them ... for which I apologise.

Loggings this month from:

Al Al Inderwisch, darkest Victoria.

A. Nonymous Unknown, emails shredded

CLP Cairns Listening Post

IJ Ian Julian, Pukekohe, New Zealand.

http://www.geocities.com/CapeCanaveral/Launchpad/7769/.

In this issue of SIGINT, Russell Bryant suggests that you...

INVESTIGATE THE UNUSUAL

One resourceful listener was able to monitor more, and therefore know more, about the evolving event by tuning into the frequencies employed by the Coode Island complex, rather than the police, fire or ambulance communications.

The May SIGINT column carried a piece on having your scanner prepared for all disaster eventualities.

I suggested that at some stage, a large-scale crisis may occur within your town or city and that you should plan for it. Furthermore, I pointed out the usual emergency service radio channels may not be the best option when something big happens.

To illustrate the point, I made mention of the absolute operational bottle neck that tied up the Melbourne Metropolitan Fire Brigade's radio system, as they attempted to fight the largest industrial fire that Victoria had ever seen at Coode Island in the western suburbs of Melbourne. I went on to say that one resourceful listener was able to monitor more, and therefore know more, about the evolving event by tuning into the frequencies employed by the Coode Island complex, rather than the police, fire or ambulance communications.

In short, I was pointing to the fact that as active scanner enthusiasts, we should look beyond the norm and investigate the unusual.

>Toward the end of that piece on the oil refineries, I stated SIGINT would revisit the topic of disaster communications from time to time in an effort to give coverage to some of the aforementioned, but not so obvious users of radio communications.

This month SIGINT examines where the dead and injured may end up following a major catastrophe. It doesn't matter if the local hospital is a two-room demountable or a multistorey teaching complex, it will be involved in the treatment of those hurt as the result of, combating the effects of an incident.

In some cases a temporary morgue may also be established at the hospital to provide better facilities for Disaster Victim Identification. Co-ordination of medical and DVI services will occur on various radio channels, including those allocated to the hospital in question.

If the incident is largest enough, the facilities of some private hospitals could be pressed into service, should those of the public institutions become over-taxed.

ORGANISED CHAOS

Most of the larger hospitals have ambulances and/or patient transport vehicles that would more than likely play a role in the evacuation of the walking or slightly injured from the scene of any disaster.

These vehicles are often fitted with two-way radios, and their frequencies should be included in any emergency list that you have compiled. Back at base, hospital security will be busy keeping control of what could best be described as organised chaos. Relatives of those involved, the media and local sticky beaks will no doubt be causing concern for security officers, who in some states hold the office of Special Constable.

The majority of security services working at hospitals use radio to co-ordinate and control. Some hospital security service radio systems use repeaters, while others are simplex. The latter will mean being close to the scene, but I would advise against getting too close.

The last thing anyone needs is some idiot delaying the progress of transporting and treating the injured. You may even be responsible for someone's death, with a trip to the coroner's court just around the corner. Keep clear of the area! Any prolonged activity at a disaster scene will mean the commitment of dozens, if not hundreds of rescue and emergency personnel. These people will need feeding, so it is conceivable that hospital kitchens will be working overtime to provide the sustenance required to keep such a large workforce going. The movement of food supplies is another activity likely to be radio controlled.

It is conceivable that all hospital services will be involved in a disaster of some type. Find out if your hospital has access to two-radio. If so, what is it used for? Is it simplex or repeater? Who uses it? What are the callsigns used by the various hospital administrative units?

These and other questions will require answers to piece together the jigsaw. Possibly the only way to get the answers you need is to listen for an extended period. Comprehensive notes are a necessity, so keep them up to date and relevant.

To assist in finding the frequencies for a hospital near you, a detailed list is included with this article. While it is comprehensive, it may contain errors and omissions. If your hospital is not mentioned, don't assume it doesn't use two-way radio communications. I have removed both internal and external hospital paging frequencies as well as those allocations employed in patient monitoring systems.

WHERE TO LISTEN

AUSTRALIAN CAPITAL TERRITORY

Output	Input	Hospital
412.8750	403.4250	Calvary Hospital Bruce
485.4000	480.2000	Canberra Hospital Garran

NEW SOUTH WALES

Output	Input	Hospital
70.4600	70.4600	Orange Base Hospital
151.2375	155.8375	Sydney Adventist Hospital
157.7500	157.7500	St John of God Hospital Goulburn
163.3375	158.7375	Sydney Hospital
165.6000	170.2000	St Vincents Community Hospital Bathurst
168.4125	168.4125	Manilla District Hospital
172.0500	172.0500	Glen Innes District Hospital
172.8250	172.8250	Wolper Jewish Hospital Woollahra

450.0750	450.0750	Lady Davidson Hospital Turramurra
462.4250	452.9250	Macquarie Hospital North Ryde
463.4250	453.9250	Allandale Hospital Cessnock
463.5000	454.0000	Royal Alexandra Hospital for Children
463.6750	454.1750	Sutherland Hospital
464.9250	455.4250	Wollongong Hospital
465.4500	455.9500	The St George Hospital Kogarah
467.4500	457.9500	Port Macquarie Base Hospital
467.7500	458.2500	Tamworth Base Hospital
467.8000	458.3000	Port Macquarie Base Hospital
469.4750	459.9750	The Childrens Hospital Westmead
469.9000	469.9000	Wollongong Hospital
469.9500	469.9500	Cumberland Hospital Westmead
470.1750	475.3750	Shellharbour Hospital
470.1750	475.3750	Westmead Hospital
470.1750	475.3750	Hornsby Kuringai Hospital & Community Services
470.2750	475.4750	Nepean Hospital
470.6250	475.8250	Coffs Harbour District Hospital
471.7750	471.7750	Roselle Hospital
472.3000	477.5000	Fairfield Hospital
472.3000	477.5000	Campbelltown Hospital
472.3000	477.5000	St Lukes Hospital Potts Point
472.3000	477.5000	Royal Ryde Rehabilitation Hospital Ryde
472.3000	477.5000	Prince Henry & Prince of Wales Hospital
472.4750	477.6750	Manning Base Hospital Taree
472.4750	477.6750	Morisset Hospital
473.2000	478.4000	Prince Henry & Prince of Wales Hospital Randwick
474.1750	479.3750	Prince Henry & Prince of Wales Hospital Randwick
474.2750	479.4750	Canterbury Hospital
474.6250	479.8250	Grenfell District Hospital
474.8250	474.8250	Mount Druitt Hospital
474.8250	474.8250	Shoalhaven District Hospital
474.8750	474.8750	Mount Druitt Hospital
474.9750	474.9750	Cumberland Hospital Parramatta
475.0000	475.0000	Shellharbour Hospital
484.8250	484.8250	Bankstown Hospital
484.8500	484.8500	Mount Druitt Hospital
485.1500	485.1500	Blacktown Hospital
485.2000	480.0000	Broken Hill Hospital
485.7750	480.5750	Bankstown Hospital
485.8500	480.6500	Bankstown Hospital
487.0500	481.8500	Concord Repatriation General Hospital
487.1750	481.9750	Royal North Shore Hospital Artarmon
487.6000	482.4000	St Vincents Hospital Darlinghurst
488.2750	483.0750	Dubbo Hospital
488.9000	483.7000	Blacktown Hospital
488.9500	483.7500	Westmead Hospital
489.0000	483.8000	Royal Prince Alfred Hospital
489.5000	484.3000	Westmead Hospital
491.7750	496.9750	St Vincents Hospital Sydney
494.2250	499.4250	Dudley Private Hospital Orange
494.9250	494.9250	John Hunter Hospital Lambton Heights
508.7000	518.7000	St Vincents Private Hospital Darlinghurst

VICTORIA

Output	Input	Hospital
75.6800	75.6800	Edenhope & District Memorial Hospital
79.3600	79.3600	Alexandra District Hospital
132.7500	132.7500	Alfred Hospital Helipad Prahran
151.2750	151.2750	Wimmera Base Hospital Horsham
153.4250	153.4250	Yarrawonga District Hospital
159.0400	159.0400	Ballarat Base Hospital
160.3000	160.3000	Wodonga District Hospital
162.3700	162.3700	Benalla & District Memorial Hospital
162.3700	162.3700	Swan Hill District Hospital
169.1200	169.1200	Wangaratta District Base Hospital
169.1200	169.1200	Beechworth Hospital
169.1200	169.1200	Ballarat Base Hospital
173.8200	173.8200	Portland & District Hospital

THE WAIT HAS BEEN WORTH IT

ALL NEW UNIDENS ARE NOW AVAILABLE

For your nearest dealer contact

Pacific Telecommunications on 03 9480 5700

450.4750	450.4750	Mercy Private Hospital East Melbourne
450.4750	450.4750	Numurkah & District War Memorial Hospital
461.5500	452.0500	Monash Medical Centre Clayton
461.5500	452.0500	Austin Repatriation & Medical Centre Heidelberg
463.0250	453.5250	Alfred Hospital Caulfield
463.7750	454.2750	Monash Medical Centre Clayton
463.9500	454.4500	Austin Repatriation & Medical Centre Heidelberg West
466.6250	457.1250	Royal Children's Hospital & Royal Womens Hospital Carlton
467.0000	457.5000	Cabrini Hospital Malvern
467.0250	457.5250	Daylesford District Hospital
467.3250	457.8250	Alfred Hospital Prahran
467.3250	457.8250	Goulburn Valley Base Hospital Shepparton
469.5500	469.5500	Bacchus Marsh & Melton Memorial Hospital
469.7250	469.7250	Burnside War Memorial Hospital Toorak Gardens
470.5750	475.7750	Maroondah Hospital Ringwood East
470.6000	475.8000	Alfred Hospital Prahran
471.6000	471.6000	Ashford Community Hospital
473.9000	479.1000	The Northern Hospital Epping
474.0750	479.2750	Sandringham Hospital
474.4500	479.6500	Royal Childrens Hospital Parkville
474.6250	479.8250	Fairfield Hospital
474.6250	479.8250	Yea & District Memorial Hospital
474.9000	474.9000	Hospital Corporation Australia Coburg
474.9000	474.9000	Freemasons Hospital East Melbourne
485.0250	485.0250	Echuca Regional Health
491.4750	496.6750	Royal Womans Hospital Carlton
493.1500	498.3500	Bendigo Hospital
494.1000	499.3000	North West Hospital Essendon
494.8250	494.8250	Wangaratta District Base Hospital
505.2875	515.2875	North West Hospital Parkville
505.5625	515.5625	Royal Melbourne Hospital
505.5750	515.5750	Box Hill Hospital
505.8625	515.8625	Williamstown Hospital
505.8750	515.8750	Royal Melbourne Hospital Parkville
506.1625	516.1625	Royal Melbourne Hospital Parkville
506.7625	516.7625	Royal Melbourne Hospital
507.6250	517.6250	Box Hill Hospital
508.2250	518.2250	Epworth Hospital Richmond
509.4250	519.4250	St Vincent's Hospital Fitzroy
509.4750	509.4750	West Wimmera Health Service Nhill
509.5750	509.5750	Royal Womans Hospital Carlton
509.9250	509.9250	Epworth Hospital Richmond

QUEENSLAND

Output	Input	Hospital
450.0500	450.0500	Allamanda Hospital Southport
462.9250	453.4250	Royal Brisbane Hospital
463.1000	453.6000	Cairns Base Hospital
463.1250	453.6250	Nambour General Hospital
463.9750	454.4750	Nambour General Hospital
464.0250	454.5250	Royal Brisbane Hospital
464.0500	454.5500	Princess Alexandra Hospital Woolloongabba
464.2750	454.7750	Royal Brisbane Hospital
465.8250	456.3250	Mater Private Hospital South Brisbane
465.8750	456.3750	Wolston Park Hospital Wacol
467.1000	457.6000	Prince Charles Hospital Chermside
467.1500	457.6500	Mater Hospital South Brisbane
467.8250	458.3250	Princess Alexandra Hospital Woolloongabba
469.4750	459.9750	Mater Hospital Townsville
469.5000	469.5000	Uniting Church Wesley Hospital Auchenflower
469.5000	469.5500	Cairns Base Hospital
469.5000	469.5000	Royal Brisbane Hospital
469.5250	469.5250	Royal Brisbane Hospital
469.5500	469.5500	Royal Brisbane Hospital
469.5750	469.5750	Royal Brisbane Hospital
469.6000	469.6000	Uniting Church Wesley Hospital Auchenflower
469.6250	469.6250	Uniting Church Wesley Hospital Auchenflower
469.6500	469.6500	Uniting Church Wesley Hospital Auchenflower
469.6750	469.6750	Uniting Church Wesley Hospital Auchenflower
469.7250	469.7250	Uniting Church Wesley Hospital Auchenflower
469.8250	469.8250	Allamanda Hospital Southport
469.9750	469.9750	Royal Brisbane Hospital handhelds
470.0000	475.2000	Ipswich Hospital
470.8500	476.0500	Townsville Hospital Board
471.1000	476.3000	St Andrews Hospital Ipswich
471.2250	471.2250	St Vincents Hospital Toowoomba
472.5750	477.7750	Ipswich Hospital
472.5750	477.7750	Toowoomba Base Hospital
473.1750	478.3750	Mater Misercordiae Public Hospital Brisbane
473.7250	478.9250	Mater Hospital South Brisbane
474.2250	479.4250	Wolston Park Hospital Wacol
474.7000	479.9000	Mater Hospital South Brisbane
475.0000	475.0000	Townsville Hospital Board
475.0500	475.0500	Princess Alexandra Hospital Woolloongabba
484.8500	484.8500	Royal Brisbane Hospital
485.0750	485.0750	Gympie General Hospital
485.1000	485.1000	Princess Alexandra Hospital Woolloongabba
485.3750	480.1750	Greenslopes Private Hospital
486.8250	486.8250	Uniting Church Wesley Hospital Auchenflower
487.1750	481.9750	Baillie Henderson Hospital Toowoomba
487.2000	482.0000	Greenslopes Private Hospital
488.3000	483.1000	Queensland Health Brisbane
490.4500	495.6500	Queen Elizabeth II Jubilee Hospital Coopers Plains
519.8000	519.8000	Princess Alexandra Hospital Woolloongabba

SOUTH AUSTRALIA

Output	Input	Hospital
73.7000	73.7000	Loxton Hospital
159.7300	159.7300	Coober Pedy Hospital
162.4600	162.4600	Royal Adelaide Hospital
172.9375	172.9375	Port Augusta Hospital
412.6000	412.6000	Womens & Childrens Hospital North Adelaide
458.0250	458.0250	Port Augusta Hospital Oodnadatta
463.4500	453.9500	Royal Adelaide Hospital
467.2500	457.7500	Womens & Childrens Hospital North Adelaide
471.6000	471.6000	Ashford Hospital
474.2000	479.4000	Lyell McEwin Hospital Elizabeth Vale
474.9000	474.9000	Ashford Community Hospital
484.5500	484.5500	Port Pirie Hospital
484.8500	484.8500	Modbury Hospital
484.8500	484.8500	Modbury Public Hospital
486.1250	480.9250	Ashford Community Hospital
486.9750	481.7750	Port Pirie Hospital
487.3500	482.1500	Royal Adelaide Hospital
488.8000	483.6000	Glenside Hospital Greenhill
488.8250	483.6250	Ashford Community Hospital
493.9500	499.7500	Flinders Medical Centre Bedford Park
494.5500	499.7500	Flinders Medical Centre Bedford Park
507.4000	517.4000	Womens & Childrens Hospital North Adelaide
508.5750	518.5750	Womens & Childrens Hospital North Adelaide
509.1750	519.1750	Womens & Childrens Hospital North Adelaide

WESTERN AUSTRALIA

Output	Input	Hospital
75.2250	75.2250	Carnarvon Regional Hospital
450.4000	450.4000	Hollywood Hospital Nedlands
461.8750	452.3750	Hollywood Hospital Nedlands
462.9000	453.4000	Royal Perth Hospital
463.0750	453.5750	Queen Elizabeth Medical Centre Shenton Park
463.3750	453.8750	Queen Elizabeth Medical Centre Shenton Park
469.5000	469.5000	Royal Perth Hospital
469.5250	469.5250	Royal Perth Hospital
469.5500	469.5500	Royal Perth Hospital
469.5750	469.5750	Royal Perth Hospital
469.6000	469.6000	Royal Perth Hospital
469.6500	469.6500	Royal Perth Hospital
469.6750	469.6750	Royal Perth Hospital
469.7250	469.7250	Royal Perth Hospital

469.7500	469.7500	Royal Perth Hospital
469.7750	469.7750	Royal Perth Hospital
469.8000	469.8000	Royal Perth Hospital
469.8250	469.8250	Royal Perth Hospital
469.8500	469.8500	Royal Perth Hospital
469.9250	469.9250	Royal Perth Hospital
469.9500	469.9500	St John of God Hospital Subiaco
470.0500	475.2500	St John of God Hospital Murdoch
470.4500	475.6500	Fremantle Hospital
474.9250	474.9250	Geraldton Regional Hospital
485.7000	480.5000	Mount Hospital Perth
489.1250	483.9250	Graylands Hospital Mt Claremont
489.4250	484.2250	Princess Margaret Hospital for Children Subiaco
489.8500	4846500	Graylands Hospital Mt Claremont
492.7250	497.9250	Whitby Falls Hospital Mundijong
492.7250	497.9250	Halls Creek Hospital
492.7250	497.9250	Regional Hospital Geraldton
492.7250	492.7250	Kununurra Hospital Hospital
492.7250	497.9250	Kalgoorlie Hospital
492.7250	492.7250	Derby Hospital
493.0250	498.2250	Osborne Park Hospital
493.2750	498.4750	Royal Perth Hospital
493.9250	499.1250	Rockingham Kwinana District Hospital
494.2250	499.4250	Rockingham Kwinana District Hospital
494.9000	494.9000	Graylands Hospital Mt Claremont
494.9500	494.9500	Carnarvon Hospital Carnarvon
495.0250	495.0250	Graylands Hospital Mt Claremont

TASMANIA

Output	Input	Hospital
77.3300	77.3300	Royal Derwent Hospital New Norfolk
77.8400	77.8400	St Marys District Hospital
77.8400	77.8400	North Eastern Soldiers Memoria Hospital Scottsdale
78.2200	78.2200	Launceston General Hospital
159.0400	159.0400	West Coast District Hospital Queenstown
469.5750	469.5750	Royal Hobart Hospital
469.6750	469.6750	St Helens Private Hospital Hobart
469.9000	469.9000	Royal Hobart Hospital
474.1750	479.3750	Royal Hobart Hospital
475.1750	475.1750	Royal Derwent Hospital New Norfolk

NORTHERN TERRITORY

Output	Input	Hospital
462.9500	462.9500	Tennant Creek Hospital
462.9500	453.4500	Territory Health Services Nhulunbuy
462.9500	462.9500	Royal Darwin Hospital
467.7250	458.2250	Territory Health Services Alice Springs
467.7250	458.2250	Royal Darwin Hospital
469.5750	469.5750	Territory Health Services Katherine
485.2000	480.0000	Mutitjulu Community Health Service Ayers Rock

IN CONCLUSION

Once again it is up to you to ascertain what the frequencies listed above are used for. Are they patient transfer or security? Maintaining accurate records is essential if you are going to maximize your listening activities.

THE FUTURE

By now the Uniden UBC780XLT should be well and truly making its mark on the hobby. So far the feedback has been nothing but positive, with most claiming its sensitivity to be the best they have seen or heard in a radio of this price bracket. To enhance your trunk monitoring even further, I am planning a series of columns examining the finer points of trunking. Detailing the tricks and trauma associated with trunk tracking. To assist in providing the best possible coverage I am asking that for your input. If there are any questions or observations you have, regarding the UBC780XLT or indeed the UBC245XLT handheld as well as trunking in general, please contact me at either PO Box 344 Springwood NSW 2777 or email rusty@hermes.net.au.

Wanting to sell your used equipment but don't want to risk of strangers sizing up your home? We have the answer! We will sell it for you. Ring Crazy Rob now!

LooKING for HF mobileantenna? Look no further, the TERLIN OUTbacker is second to none! If Crazy Rob can work the world on his pushbike while cycling around Melbourne with ICOM IC-706KIIG with 5/9 reports, just think what results you can get in your car. PS. Click on our website to see Rob's photo!

HARRIS Communications

78 Elgin Street Carlton Vic 3053

Ph: 03 9347 6264 Fax: 03 9347 3629

TET-Emtron Antenna Systems

Join the many Amateur & CB TET Owners

All prices subject to change without notice and are PLUS FREIGHT

TET 27MHz CB Dual Drive Beams	DISCOUNTED PRICE
TE-311HB 3 Element 10/11 Meter Beam	$192
TE-511 HB 5 Element Beam	$278
TET Rotatable HF Dipoles	
TE-13 3 band Rotatable Dipole 14-21-28 MHz	$247
TE-13W 3 Band Rotatable Dipole 10-18-25 MHz	$268
TE-26 6 band Rotatabale Dipole 10-14-18-21-25-28 MHz	$835
TET Seven band HF Beams	
TE-47 3 EL Beam on 14-21-28MHz, 1EL 10-18-25MHz, 1EL 7MHz	$1107
TE-57 3 EL Beam on 14-21-28MHz, 2 EL 10-18-25MHz, 1EL 7MHz	$1230
TET Six Band Beams	
TE-26 2 Element Beam on 14-21-28MHz, 1 Element on 10-18-25MHz	$835
TE-46 3 Element Beam on 14-21-28MHz, 1 Element on 10-18-25MHz	$953
TE-56 3 Element Beam on 14-21-28MHz, 2 Element on 10-18-25MHz	$1156
TET Four Band HF Beams	
TE-34 3 Element Beam on 14-21-28 MHz, 1Element on 7 MHz	$850
TE-44 4 Element Beam on 14-21-28 MHz, 1 Element on 7 MHz	$995
TET Three Band HF Beams	
TE-23 3 band 2 Element Beam 14-21-28 MHz	$515
TE-23M 3 Band 2 Element Mini Beam 14-21-28 MHz	$530
TE-33 3 Band 3 Element Beam 14-21-28 MHz	$723
TE-43 3 Band 4 Element Beam 14-21-28 MHz	$910

Australia's Premier CB Radio Shop

CB HF 28/27MHz RADIOS

GALAXY	Saturn Base 6 Band 50W + Freq Counter
DIRLAND	DSS9000 520Ch AM/FM/SSB/CW/25W
DELTA FORCE	Magnum with AMT & ECHO
SUPERSTAR	3001 40Ch 27MHz (Ext Freq Price on req)
MAGNUM 357	New Ideal Base or Mobile 150W

ZETAGI LINEAR AMPLIFIERS

B-150R	Linear Power Amp 26-30MHz 110W 13.8V
B-300P	Mosfet Power Amp 26-30MHz 240W 13.8V
B-550P	Linear Power Amp 20-30MHz 320W 13.8V
CONNEX	Linear Power Amp 3-30MHz PreAmp 225W
SILVER777+	Linear Power Amp 3-30MHz PreAmp 300W

POWER SUPPLIES

DIRLAND	PS22 22Amp Power Supply (SPECIAL PRICE)
SPECTRUM 400	5/8 16 Radials 5.5dB

Ring CRAZY ROB for the best deal on all CB equipment!

When only the best will do – ICOM!

AMATEUR TRANSCEIVER

IC-910H NEW	2/70/23cm (opt. UX-910)	*The Innovator*	*Special Price - Ring*
IC-2100H	2 Meters	*Single band with loads of grunt*	*Special Price - Ring*
IC-T2H	2 Meters h/held	*For those who want one band*	*Special Price - Ring*
IC-718	HF Transceiver	*What a radio! It has the lot!*	
IC-706IIG	HF/6/2/70cm	*The Secret Weapon*	
IC-746	HF/6/2	*The Destroyer*	
IC-756PRO	HF/6 Transceiver	*The Battle Ship*	
IC-775DSP	HF Transceiver	*The Flag Ship*	
IC-2800H	2/70cm	*The Innovator*	
IC-207H	2/70cm	*Base or Mobile*	
IC-T8A	6/2/70cm	*Three bands in one*	
IC-T7H	2/70cm	*For those who want two Bands*	
IC-Q7A	2/70cm	*Big Things Come in Little Boxes*	
IC-T81A	6/2/70/23cm	*The all-new quad bander*	

RECEIVERS/SCANNERS

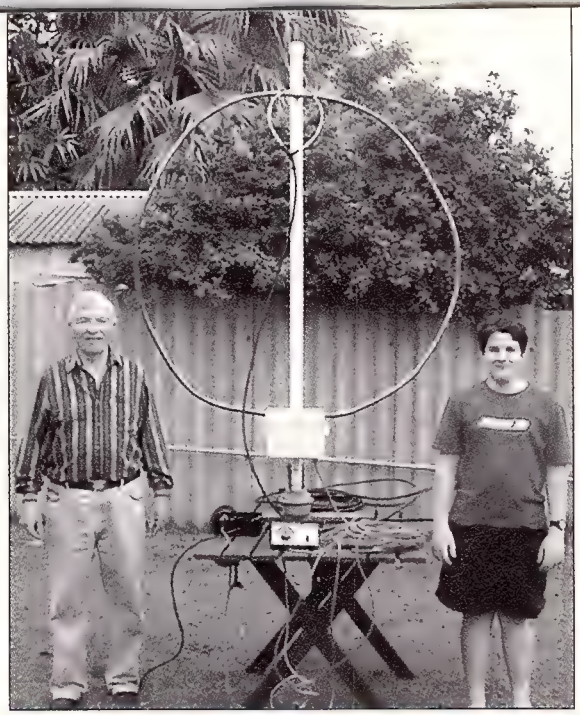
IC-PCR1000	PC Receiver	*Scanner in a Computer*
IC-PCR100	PC Receiver	*Ideal to Eavesdrop*
IC-R75	Receiver	*The Receiver of the Future*
IC-R3 (New)	Receiver	*Covers .5-2.4GHz - even watch TV!*
IC-R8500	Receiver	*With all the Bells & Whistles*
IC-R10	Receiver	*All mode & 800 mem ch*
IC-R2	Receiver	*Little, but big in performance!*

UHF CB RADIOS

IC-F2010	UHF 160ch	*The Best UHF CB/Comm*
IC-40S	UHF 40ch+20CB	*For all Occasions*
IC-40 Jnr	UHF 40ch CB	*It's a little beaut*
IC40GX	UHF 40ch CB	*With desktop charger*

Ring CRAZY ROB for the best deal on all ICOM equipment!

E&OE www.harrisguns-n-radios.com



Left: Fred, VK6GE and grandson Alistair with the completed loop antenna.

Frequency tracking loop antenna

Part one of two. By **Phil Harman** VK6APH/W6

Small antennas are very attractive for apartment dwellers and others facing space restrictions. The magnetic loop antenna holds much promise in providing an effective antenna in a very small space. Despite its attractions, it has never gained the popularity it deserves - it's about time we changed that!

As the amateur population ages many are faced with moves to new locations where size, or planning restrictions, prevent the erection of full-size antennas. There is a real need to develop small antennas that are highly efficient and effective.

As we reduce the size of an antenna below its half wave resonance two things happen: the radiation resistance drops and. the SWR bandwidth narrows

Never are these two effects more prevalent than in the magnetic loop antenna.

The magnetic loop antenna, so called because of the high magnetic field it generates in the near field, is simply a parallel tuned circuit where the inductance is formed from a conducting loop.

Figure 1 shows the general construction, the circumference of the loop is typically between 0.05 and 0.24 of a wavelength and therefore requires a capacitor to resonate it.

RADIATION RESISTANCE

We are probably accustomed to thinking of the radiation resistance of an antenna as being in the order of tens of ohms.

For example, a half-wave dipole in free space has a radiation resistance of 75 ohms and a quarter-wave vertical over a perfect ground, 35 ohms.

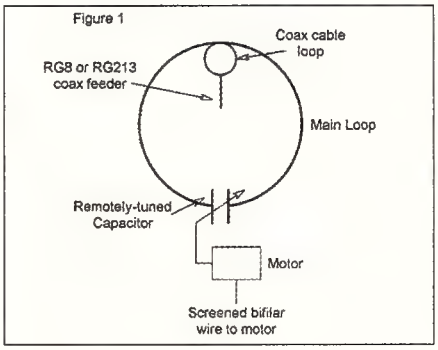
In contrast, a magnetic loop can have a radiation resistance of a fraction of an ohm. This presents some interesting challenges, not necessarily in matching it to standard coax impedances, but rather in reducing losses.

The losses we are concerned about are those relating to the material we make the loop from and earth losses. If the resistive losses of the loop and earth are equal to the radiation resistance then half our received signal or transmitted power is wasted as heat.

If the losses are higher, then more of our precious power is lost.

As we will see shortly, with careful construction such losses can be minimised.

Figure 1



BANDWIDTH

It's a fact of life that small antennas will have a narrower bandwidth than a full-size equivalent. By bandwidth I mean the frequency range over which the SWR is below a certain level, for example 2:1.

The magnetic loop, when correctly constructed to have low loss, can have a bandwidth of less than 3kHz. At an extreme, this will make it difficult to transmit a SSB signal. Another way of looking at this is that the tuned circuit comprising the antenna has a high Q factor. The higher the Q the lower the losses, but narrower the bandwidth.

Since we require the antenna to operate over an entire amateur band, or bands, some form of tuning is required.

This is typically achieved using a variable capacitor across the open ends of the loop.

If the loop is close to the operating position then this can be adjusted manually and if remote then by using some form of servo system.

It is the narrow bandwidth, and need for constant adjustment of the loop tuning when changing frequency, that has contributed to the magnetic loops unpopularity in amateur circles. However, as we will see, there is a simple and elegant solution to this problem.

MAGNETIC LOOP DESIGN

The maths involved in the design of magnetic loop antennas are quite straightforward and most antenna handbooks explain these along with graphic design methods.

Alternatively, there is a very elegant computer design aid developed by Reg Edwards, G4FGQ, available free over the Internet. The URL is *www.btinternet.com/~g4fgq.regp/*

Reg's software, RJELOOP1.exe, allows you to make changes to the shape, size and material used to construct the loop and observe the effects on the efficiency. A screen shot of the software in use is shown in **Figure 2**. Since this is a DOS program, it will run on virtually any speed PC.

The first design decision we need to make is the shape of the loop. Ideally this should be circular since this shape will have the highest inductance for the least conductor length and hence lowest loss and highest Q.

The table below shows the recommended order for loop shape and the relative increase in loss over a circular shape.

Loop Shape	Relative Loss (%)
Circular	0
Octagon	2
Hexagon	4
Pentagon	6
Square	10
Equilateral triangle	23

For loops operating over the 20 to 10m bands then a circular form is generally

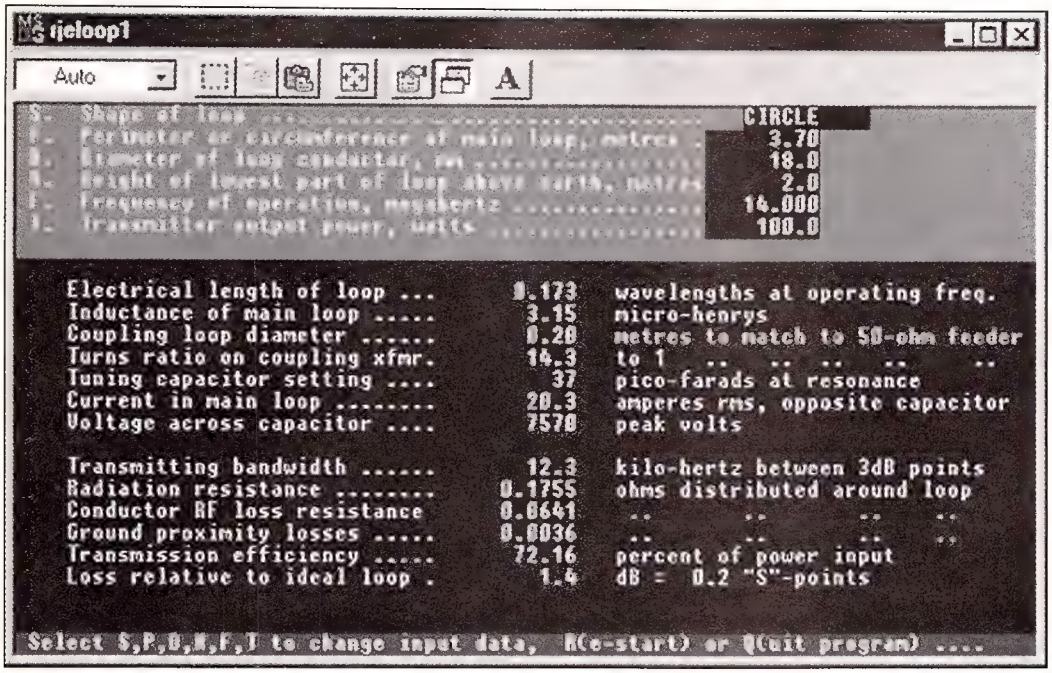

rjeloop1
Auto
A
S. Shape of loop ..... CIRCLE
P. Perimeter or circumference of main loop, metres . 3.70
D. Diameter of loop conductor, mm 18.0
H. Height of lowest part of loop above earth, metres 2.0
F. Frequency of operation, megahertz 14.000
T. Transmitter output power, watts 100.0
Electrical length of loop ... 0.173 wavelengths at operating freq.
Inductance of main loop ..... 3.15 micro-henrys
Coupling loop diameter ..... 0.20 metres to match to 50-ohm feeder
Turns ratio on coupling xfmr. 14.3 to 1
Tuning capacitor setting .... 37 pico-farads at resonance
Current in main loop ..... 20.3 amperes rms, opposite capacitor
Voltage across capacitor .... 7570 peak volts
Transmitting bandwidth ..... 12.3 kilo-hertz between 3dB points
Radiation resistance ..... 0.1755 ohms distributed around loop
Conductor RF loss resistance 0.0641
Ground proximity losses 0.0036
Transmission efficiency ..... 72.16 percent of power input
Loss relative to ideal loop . 1.4 dB = 0.2 "S"-points
Select S,P,D,H,F,T to change input data, R(e-start) or Q(uit program) ....

Fig 2. Screen shot of design program

achievable. When designing for the lower bands then octagonal or square loops generally are the order of the day.

CONSTRUCTION MATERIALS

As we have already seen, in order to keep the efficiency of the antenna as high as possible the RF losses of the loop material must be minimised. The RF losses of the loop conductor are related to the resistance of the material but, since RF energy flows on the surface of a conductor (the so called 'skin effect'), these are not identical.

Due to the skin effect the loop conductor can be hollow and this makes for a welcome relief in terms of weight and ease of bending the material. The number one choice for the loop conductor is large diameter copper tube.

The larger the diameter tube we use the lower the RF losses and higher the antenna efficiency. However, since the antenna is operating over real earth we need to include earth losses in the overall antenna performance.

Reg's program enables you to calculate the earth losses for a particular loop at a certain height. The earth losses from operating a magnetic loop close to the ground can equal the radiation and RF loss resistance and sets an upper limit to the efficiency of the antenna system.

Fortunately, on the HF bands, at heights of a few metres between the bottom of the loop and ground, the losses are not significant. On the LF bands though, earth losses can become quite significant at such low heights.

Bending the copper tube into a circle is quite straight forward if annealed copper pipe is used. This is soft enough to be bent by hand around a suitable former - a barbeque table in the case of **Figure 3**. If you are concerned about kinking the pipe while bending then packing the pipe with dry sand, and temporarily sealing the ends, before bending will ensure the pipe does not deform.

In Australia you need to ask specifically for annealed copper pipe since bending standard copper water pipe is much more difficult. My local plumber's supply warehouse only stocked 18mm annealed copper pipe but as we shall see this is sufficient diameter for an HF loop. The pipe is usually stored in rolls, a good indication that you are purchasing the right material is to ask the supplier to try not to bend it unduly while cutting to length.

While copper pipe is the number-one preference, other materials can be used. Referring to the table below you can see the effects on efficiency of making the loop from alternative materials.

A number of authors suggest using the outer braid of large diameter coax cable - in fact shorting the inner and outer together to form the loop. While in theory this should work I found that making a low-loss, non-soldered connection between the braid and the variable capacitor is difficult.

An alternative is 18mm semi-rigid coax cable, LDF4, which is an ideal alternative to copper pipe since it is very easy to bend and can be readily drilled to mount the variable capacitor.

Other designers have used short lengths of straight copper pipe joined with 45-degree elbows to form an octagon. As long as the joints are silver soldered then this would be an acceptable alternative. A portable design where the joints are simply pushed together is a recipe for low efficiency.

It must be stressed that, in order to keep the loop RF losses a low as possible, the standard of mechanical construction must be very high. It's no use making a loop out of large diameter copper pipe and then soldering flimsy wires to the ends in order to connect to the variable capacitor. If possible, make the loop out of one single piece of material and avoid any joints. Bolt the ends of the loop directly to the variable capacitor using large diameter bolts.

VARIABLE CAPACITOR

The biggest challenge in making a magnetic loop antenna stems from the variable capacitor used to tune it. Two problems are evident; first, a standard fixed-stator variable-rotor capacitor can't be used due to the contact resistance between the rotating vanes and its connections. A standard single-gang variable capacitor is therefore not suitable, unless the loop is only to be used on receive where losses are less important.

Second, due to the high Q of the loop, the voltage across the capacitor can reach many thousands of volts. This calls for transmitting-type capacitors with wide plate spacing.

There are a couple of ways round this problem. If you are very lucky, your junk box may contain a suitable differential, or butterfly, capacitor. Alternatively, you can connect two regular capacitors in series as a number of commercial designs do.

Loop Material	Resistance per 30.5cm (1ft) @ 1.8MHz (milliohms)
6mm (1/4") dia copper water pipe	4
12mm (1/2") dia copper water pipe	2.4
18mm (3/4") dia copper water pipe	1.6
25mm (1") dia copper water pipe	1.3
12mm (0.5") dia coax cable	
2.2 (inner and outer conductors welded) 200lb copper wire	10
Aluminium	Increase above figure by 1.7 times

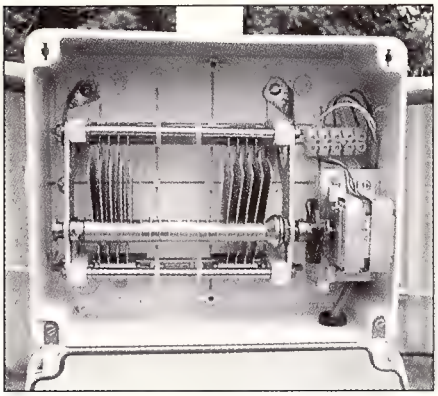
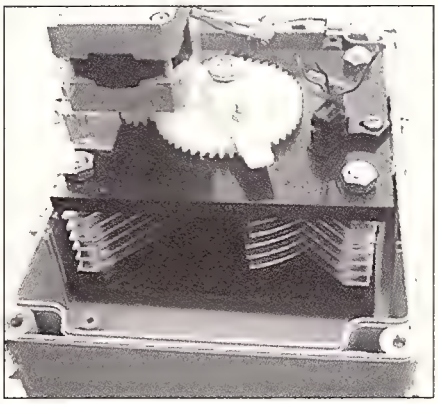


Fig 4. (above) VK6GE's capacitor.

Fig 5. (below) The author's capacitor.



AUSTRALIAN-MADE ANTENNAS

SETTING A NEW STANDARD

All new ⅝ vertical antenna fully assembled
factory tuned with 16 radials $139
Dual drive 26-30 5 ele beam s/s fix $275
4 ele 26-30 mhz beam antenna $235
5-6 or 7 ele high gain beams 11m.....call
3 ele Delta loop 10-11m $314
⅝ vert 4¼ wave radials.....$170
TTFD/dipole 7 to 30 mhz gain 3 dbd.....$245
Duo-band 10/15-3 ele each band $356
Log periodic 9 ele 13/30 9.6 mt boom $980
Tri-band 6 ele s/s fix 6.8 mt boom.....$695
3 ele 20 mt comp opt s/s fix.....$370
3 ele 15 mt comp opt s/s fix.....$265
MB vert no traps 10-80.....$291
40 mt linear/loaded 2 ele beam $555
6 mt 6 ele comp opt beam $236
6 ele 6 m n b s design 12.5 dbi $325
12 ele 2 m beam bal/gamma /f-d feed $130
70 cm 17 ele high performance yagi $119
2 m vert 2⅝ colinear 4 rad.....$94
New/bal uns 1-1 to 16-1 to 3 kw.....call

COM1200PA

COM-AN-TENA
(formerly a.j. & j. coman)
83 Belgrave-Hallam Road, Hallam 3803
Ph: (03) 9702 4028
Mobile: 0419 542 437 ANDY VK3IV

Alternatively, you can modify a conventional twin-gang capacitor and finally you can build one from scratch. Let's look at the last two options in more detail.

The 20m to 10m magnetic loop I designed for Fred, VK6GE, required a variable capacitor that would tune from 5 to 35pf. Fred's junk box contained a single-gang transmitting variable capacitor that measured 220pf maximum.

Fortunately, the stator plates were held together with threaded studding. Fred was able to disassemble the capacitor, saw through the studding, fit some insulators and end up with a dual-gang wide-spaced capacitor of about 100pf per section.

Since, in this application, the two sections of the capacitor will effectively be in series the maximum capacitance will drop to 50pf, well within the range required. Unfortunately, the minimum capacitance was a little over 8pf, which meant that the loop would not tune to 10m.

With care, Fred removed vanes from the variable to give a swing of 5 to 40pf. His finished capacitor can be seen in **Figure 4**.

Getting sufficiently low minimum capacitance can be quite tricky and before removing 'one last pair of vanes', if possible, it's desirable to completely remove the rotor and see what the residual capacitance is.

If this still proves too large then you will have to reduce the diameter of the loop a little to compensate.

Not being equipped with such a plentiful junk box, I built my variable capacitor from scratch. Although time consuming this was quite easily achieved using hand tools, a drill press and vice.

I built the butterfly capacitor designed by Tony Van Herck, ON4CEQ, and described on his Web page at www.qsl.net/mnqrp/Loop/Mag_Loops.htm, see **Figure 5**. This gave a swing of 5 to 56pf and 7000 volt rating.

Changing the frequency to 29 MHz reduces the capacitor to 5.1pf, increases the bandwidth to 167kHz and the efficiency to 97%.

This is quite a practical design; if we try to increase the efficiency on 20m by increasing the size of the loop then the minimum capacitance becomes too small to be able to resonate on 10m.

By relinquishing 10m, but keeping 12m, and increasing the perimeter of the loop to 4.5 metres the efficiency on 20m increases to 81%.Increasing the pipe diameter to 25mm increases the efficiency to 79%, an improvement of 0.4dB, which is not really worth the additional cost of copper, not to mention the difficulty in bending it.

The software makes it very simple to look at the effects of changing parameters and incorporating materials that may be at hand. With a loop perimeter of 3.7m, and a height above ground of 2m, we get a theoretical efficiency of 72%. That means 28 of our 100 watts is being lost in heating the copper pipe ever before it leaves the antenna. In fact, that's not too bad, and if we can actually construct a loop with losses this low then in practice the performance will be very acceptable.

It's interesting to see what happens as we reduce the height of the antenna above ground. If we reduce the height to 1m the efficiency drops to 66% and at 0.5m, 52%.

If you experiment with different values, you will find that above 2m we have reached the point of diminishing returns and extra height has no advantage in terms of losses, although as always with antennas the higher the better.

On the LF bands, the ground proximity losses become quite significant, due to the lower heights in terms of wavelengths above ground, which we can normally achieve at these frequencies.

As a rule of thumb, reducing the diameter of the loop conductor until the loop losses equal the ground proximity losses gives a good practical starting point.

MATCHING

The software also gives two options for matching the loop to a 50-ohm coax feeder.

The first is a simple single-turn coupling loop. This can be conveniently constructed from the coax feeder used to connect the transceiver to the antenna.

From Reg's program, we see that the diameter of the coupling loop needs to be 0.2m.

Strip the outer braid from the coax for a length equal to the circumference of the loop (i.e. the diameter x 3.142) plus a few centimetres more for soldering. Form the inner into a loop of the correct diameter and solder the exposed inner to the outer braid.Cover the joint with a silicon-based sealer to prevent water getting into the braid of the coax and rendering it useless. Wrap the exposed inner insulator of the coax cable with electrical tape otherwise it will rapidly deteriorate in sunlight.

Some designs recommend using a semi-shielded coupling loop, a Faraday shield, in order to reduce the pick up of local electrical noise. I couldn't detect any difference in substituting this for the simple technique above.

The coupling loop is attached to the main loop opposite the tuning capacitor **(see photos).**

The coupling loop should be insulated from the main loop and this is automatically achieved by the nature of the inner insulation of the coax feeder.

The exact position of the loop and its shape should be adjusted for minimum SWR over the frequency coverage of the loop.

Deforming the coupling loop to form an oval is a useful technique to fine-tune the SWR. An alternative coupling technique is to use a ferrite transformer. This entails slipping a suitably large ferrite toroid over the main loop. The loop forms a single-turn primary for the transformer.

Reg's program calculates the turns ratio of the transformer, in this case 14:1. So, 14 turns are wound around the toroidal core and connected to the 50ohm coax feeder. As in the case of the coupling loop, the transformer is opposite the tuning capacitor. The exact number of turns will need to be adjusted to obtain the lowest SWR over the loop's operating range.

With the high current flowing in the loop, 20A as calculated from Reg's program, there is a possibility that the toroid will saturate.

This can be checked by running the antenna at full power for a few minutes and then checking the temperature of the toroid. A rise of a few degrees above ambient indicates the core is saturating and an alternative should be sort. Suitable toroids are available in the Amidon range.

In the next (September) issue Phil provides information on constructing the Servo System and where to obtain the necessary software and a ready-programmed 16C84 chip.

PRACTICAL EXAMPLE

Lets use Reg's program to design a magnetic loop antenna that will cover the 20 to 10m bands. We will use 18mm copper tube in a circular configuration.

After starting the program we enter the following data:

Shape of loop	Circle
Perimeter or circumference of main loop, metres	3.7
Diameter of loop conductor, mm	18
Height of lowest part of loop above earth, metres	2
Frequency of operation, Megahertz	14
Transmitting power output, Watts	100

The program then calculates the following values

Electrical length of loop	0.173 wavelengths at operating freq
Inductance of main loop	3.15micro-henrys
Coupling loop diameter	0.2 metres to match to 50ohm feeder
Turns ratio on coupling xfmr	14.3:1 to match to 50ohm feeder
Tuning capacitor setting	36.9 pf at resonance
Current in main loop	20.3 amperes rms, opposite capacitor
Voltage across capacitor	7570 peak volts
Q when transmitting	1141
Transmitting bandwidth	12.3kHz between 3dB points
Radiation Resistance	0.1755ohms distributed around loop
Conductor RF loss resistance	0.0641 ditto
Ground proximity loss	0.0033 ditto
Transmission efficiency	72.16% of power input loss relative to ideal loop
	1.4 dB = 0.2 "S" units

G. & C. COMMUNICATIONS

Authorised dealer for: Kenwood • Barrett RFDS • GME Electrophone • Uniden • RF Industries • Altronics

60 Channels on the Big Screen

▶ UH090 UHF & AM in one

▼ 780 XLT Trunk Tracker

▲ TX4400

Australia-wide mail orders welcome. Payment by credit card, cheque or money order.

19 Arleon Crescent Cranbourne 3977
Ph 03 5996 3298 Fax 03 5995 0184

Email: gccomm@netspace.net.au
www.netspace.net.au/~gccomm

SUNDRY ASSORTED MODIFICATIONS

By **Greg Towells**, VK2GJT
Email: vk2gjt@ix.net.au

Be aware that you may void a warranty by performing any of the following modifications. R&C has not tested them and makes no warranty as to their serviceability.

TS-850 SEPARATE RX ANTENNA INPUT

This is near the top of everyone's list when they are asked, "What things annoy you about the TS-850S". Here is a reasonably simple way to do it and should only take a few hours to complete.

Remove the top panel (you don't need to take off the bottom one). Remove the plate which sits between the fan and the back of the radio. This covers the output filter PC board. Unsolder the connections to the SO-239 output connector.

Remove the three cables from the PC board next to the SO-239; this includes two coax and one 3-conductor harness. Remove the two screws holding in the PC board and remove it.

Locate the trace that goes from the relay's normally closed contact. You can use an ohm meter to find it - probe from the wire that went to the SO-239. You will find a short trace on the back of the board, which runs to a chip capacitor.

Cut this trace and solder some very small coax to each side of the cut – connect ground to the nearby ground trace. Make the cables about 100cm long.

Remove the antenna tuner. There are two screws in the back and front (you will need a magnetic screw-driver) and one on the side.

You will need to carefully unplug two wire harnesses and one coax connector.

Drill two holes for phono jacks on the back of the radio. Be careful not to obstruct the screw hole for one of the screws in the back of the antenna tuner. The best place is between the RF output connector and the groundpost. Put them on top of each other and as close to the bump on the back panel as possible. A handy suggestion overheard recently is to use a vacuum cleaner while drilling to make sure any metal chips don't get into the radio.

You will find a small hole under the SO-239 where you can feed the two coax lines through. Solder them to the phono jacks and reassemble everything.

You could put back-to-back diodes on the RX antenna's input, but you may not want to do this. A better thing would be to add a relay to disconnect the RX antenna input when transmitting. Instructions to do this appear in the SWITCH BOX MOD that will be following next. Obviously, you will need a jumper cable to make your receiver work again.

SWITCH BOX MOD FOR SEPARATE RX ANTENNA INPUT

You will need the following parts for this mod:

A 4-position rotary switch, DPDT 12 VDC relay, a 1 k ohm pot (optional), 12 phono jacks (or you can get by with 9), a mini box for above and knobs, and a clamp diode for relay coil if not included in relay.

This box does two things. It disconnects the receive antenna input when transmitting and allows selection of the transmitting antenna or one of three RX antennas when receiving. The pot can be used for RF attenuation if your rig doesn't have one.

The relay is controlled by the PTT output from your rig that normally would go to your amplifier. Then one set of the contacts is used to key your amplifier.

Don't forget to put a diode across the coil of your relay if there isn't one internally, otherwise, you will have undesired arcing across the contacts of the relay in your radio.

The other set of contacts disconnect the output of the rotary switch when transmitting. The rotary switch selects either the signal coming from the transmitting antenna (from the TR relay in your rig) or one of three receiving antennas.

Use two phono jacks per RX antenna so that you can feed them to other boxes for other radios. You could also use two jacks for +12 volts so you can jumper power to another box.

You can build up one of these boxes in an hour or two. You can epoxy the relay to the mini box. If you want the pot there to act as an attenuator, just hook it up as you would a volume control. One end is ground, the other end goes to the output of the rotary switch and the wiper goes to the output. Use shielded cable as much as possible to avoid stray pickup.

FINE TUNING FOR THE SANGEAN 803A

These instructions describe how to modify a Sangean 803A so that the BFO Pitch acts as a fine (approximately +/- 5kHz) tuning control on all but the FM band. Before you worry about losing your BFO, the good news is that you don't lose the BFO. All this modification affects is the half of the switch which determines when you can fine tune, not the half which switches the BFO on and off. If this sounds illogical, then the key is to understand that the 803A's BFO TUNE isn't a BFO TUNE at all, it's a fine tune!

The 803A's BFO is a 455kHz fixed frequency oscillator. What is labelled as BFO TUNE controls an earlier oscillator in the receiver's AM conversion chain.

Thus when you permanently activate this control you have fine tune all the time and when you switch on the BFO you fine tune the incoming signal against the fixed BFO, not the more conventional vice-versa.

The tools required are a small-to-medium Philips screwdriver, a small soldering iron, some solder and a means of removing surplus solder (e.g a solder sucker or a bit of desoldering braid).

Make sure that you have a note of any preset frequencies you have programmed into the memories. Turn the radio off; remove all external connections (e.g. headphones, external power, external aerial) from the radio. Close and clip down the radio's own whip aerial.

Take the radio to a well-lit workbench. Put something on the workbench to prevent damage to it or to the radio. Lay the radio facedown on the table so that the base is nearest to you. Remove the battery compartment door and then remove the batteries.

Unscrew the six screws which retain the back panel of the case; five are down recesses in the back panel at the top left, top right, bottom right and bottom-centre-right; the sixth is in the left corner of the battery compartment. Try to leave the screws in their respective holes - you can feel when the screws have been unscrewed enough, when they don't seem to be coming out anymore!

Gently free the back panel from the rest of the radio case but don't try to pull it away from the radio - there is an awkward wire connecting the whip aerial.

Once the back panel is free, lift it a little, and then swing it back away from you, rotating it anti-clockwise in a way that keeps the left-hand side of the back panel over the radio and hence the aerial wire safe! Set the lid down and examine the circuit board, which lies behind the BFO ON/OFF switch.

The BFO ON/OFF switch is mounted directly onto this circuit board and you will see the switch's six solder pads arranged as two rows of three.

The row to work on is furthest from you. Calling these, from left to right, 1, 2 and 3, use the solder removing gear to remove all solder from pad 3. This should leave pin 3 visibly isolated from the surrounding circuit board.

Next, solder pins 1 and 2 together - probably most easily done by melting the solder on both pins by spreading the soldering iron across the two and then introducing some extra solder to bridge them - the sort of thing we usually do by mistake.

That's it. Replace the back, taking care not to catch the awkward wire in the case - or anywhere else. Do up the six screws evenly, i.e. do them up until they are all just starting to resist you, checking that the back panel is fully onto the rest of the case as you go, then give each screw a little bit more of a turn. Don't leave them loose, but don't tighten them any more than that - its only plastic!

Restore batteries and any other items detached at the start Do remember that the fine tune is always in use on AM, so at it's extreme you'll be 5kHz off the indicated frequency. Talking of indicated frequency, you might find that stations appear to be on tune when the BFO control is slightly off its mid-position. Well, no synthesiser is dead on frequency, and the point is that this fine tune lets you receive stations optimally and this won't always be on the centre frequency.

One of the best features of having a fine tune is that a whistle interfering with a station you're tuned directly onto can usually be nulled out by using the fine tune to slip slightly off frequency.

If you want an 803A++, get back into the set and use a proper trimming tool to adjust T111 to bring the radio bang on tune!

KAM PLUS PROBLEMS WITH TS-850

A common problem when using a KAM-Plus multimode with the Kenwood TS-850 or TS-450 occurs when the KAM-Plus is coupled to the Accessory-2 socket on the back of the transceiver, producing noticeable distortion of the transmitted audio when using the microphone in SSB mode.

The problem is easy to cure by disconnecting the Accessory-2 plug from the back of the transceiver, but this means moving the transceiver around to operate on SSB. The problem is caused by the input sensitivity of the rear Accessory-2 socket being set to high, so that it picks up very low-level noise from the KAM-Plus and associated computer wiring. This mixes with the microphone signal, to produce the distortion.

The cure is to reduce the input sensitivity of the radio, thus reducing the chance of distortion, also it goes without saying that the output from the KAM-Plus must be increased to compensate for this.

With both the TS-450 and TS-850, adjusting the input sensitivity is straightforward and the transceiver manuals show you the appropriate control and its location. This is in both cases VR18, to be found on the main board. In practice it has been found best to adjust this control fully counterclockwise.

Then we need to adjust the output from the KAM-Plus by varying potentiometer R28 and setting removable link (K9). This link is factory set on one post only, (in the open position)! This should be connected shorting the two posts, thus putting the KAM-Plus into the high output position, and then potentiometer R-28 is adjusted to give full power out from your HF radio with very little ALC deflection, when the MIC gain is in the normal operating position. After this is done, you will find that your problem is over and you can now simply change from digital modes to SSB. Remember, if you have your Beacon activated to turn it off or it could cause a few comments when operating SSB.

SUBSCRIBE

to Radio & Communications magazine and ensure your copy of the industry's "must read" publication – and all at discounted rates!

Subscribing also insures against any interim price rises.

It's the way to go!

AUSTRALIA (GST incl)	**$55 per year (12 issues)**	**$110 per two years (24 issues)**
NZ, SE ASIA	**A$80 per year (12 issues)**	**$160 per two years (24 issues)**
REST OF WORLD	**A$95 per year (12 issues)**	**$190 per two years (24 issues)**

Radio and Communications
Incorporating AMATEUR RADIO ACTION and CB ACTION

Subscription Form
(new and renewals)

NAME: _____

ADDRESS: _____

_____ POST CODE: _____

Phone: _____ Fax: _____ email: _____

Cheque enclosed for _____ or debit my VISA / BANKCARD / MASTERCARD / AMEX

Card No. ☐☐☐☐ ☐☐☐☐ ☐☐☐☐ ☐☐☐☐

Signature _____ Exp _____

Tick here if this is a renewal or addition to an existing subscription ☐

Post to Radio & Communications Subscriptions, PO Box 1010, Caulfied North, VIC 3161.
If you are paying by credit card, you may fax this form to (03) 9527 7766 or email your details to: msnews@ozemail.com.au

BC9000xlt KEYBOARD TRICKS

Someone asked me awhile back if I was aware of any keyboard tricks for the Uniden BC9000xlt. These are what I have found for this radio.

By holding down the 2, 9 & DLY keys as you turn the 9000XLT on, you enter a sort of Test Mode. To do a "keycheck test" you can hit any key or turn the VFO knob in either direction and the alpha display will tell you what key you're touching or which direction you're turning the VFO knob.

At this point, if you momentarily hit LOCK (to the right of the VFO knob) and one other button various things will happen:

LOCK & C - REPLACES ALL MEMORIES w/1300MHz and alpha-tags channels 1-250 with CH 00-249 in the display. Again, will effectively wipe out your memories!

LOCK & D - Checksum and Firmware Version Number (v.09 in ALL 9000s to date)

LOCK & E - LCD Display Test.

LOCK & PROG - Runs a short, continuously repeating demo program incorporated specifically for showing at the Jan 1995 CES in Las Vegas. It also sounds attention tones as the message scrolls on the display! Note that the word "scanner" is spelled "Scaner" in the demo program; it was too late to change this error which originated in Japan.

The last three tricks will NOT wipe out memory. Only LOCK/C will do that.

ALINCO DR-110 BACKLIGHT REPLACEMENT

This mod has been presented before way back in the dim (no pun intended) past, but some changes have been noted to parts needed. While a good, solid performer, this radio has a nasty habit of going through panel lights like my kids go through their trouser knees.

The big problem is when the lights all blow, the display is totally black. If anyone can suggest a fix or a way to extend the working life of DR-110T panel lights, please let me know.

Anyway, on with the mod. This should also work with the DR-112 although mine has yet to blow a single lamp in the many years of operation here, as opposed to the 110T going through lots.

You will need the following tools: a low-power soldering iron, a desoldering tool or wick, small needle nose pliers, small/medium Philips screwdriver and fine solder as required.

The replacement parts are 'grain-of-wheat' lights, available presumably from Alinco. I obtained mine from WES Components in Sydney. They are 3mm 60ma 12v lead lamps, WES part number NL692-3-12.

Previous mods I have seen around call for micro lamps from Tandy - don't try them, they are too big and will not fit into the holes built into the display unit. I found out the hard way.

You will need to fiddle a bit with these lamps, just remove most of the insulation so that they are identical with the dead lamps you remove from the radio.

This is what to do when you have obtained the necessary lights.

Remove the top and bottom cover. Remove the three knobs from the front of the radio.

Remove the nut from the shaft of the channel selector. Remove the nut from the microphone connector. Remove the front plate from the radio. Take care with this step as the panel has snaps on top and bottom.

Remove the three small Philips screws that hold the PC board to the front of the radio. Do not cut any wires. Locate the tabs holding the display to the PC board and carefully bend them straight. Remove the display from the PC board and set aside.

Locate the six backlights. One is under the off/on switch; three are above the row of small switches. These four lights have a blue rubber cover on them. Finally, two lights are mounted where the LCD display was.

Given the number of times I have had these backlights blow, I decided to only replace the display backlights as I know where and what each of the switch controls does without needed illumination. It is your choice, but assuming you decide to do them all, I will go over replacement of the lot. Replace the light under the power switch, remembering to use the blue cover over the new light as well as the yellow sleeves on wires. You solder this light from the front.

Replace the three lights that are above the micro switches on the front of the PC board. These will have to be unsoldered from the back. Again, replace the blue covers.

Replace the two lights that stick through holes that go where the LCD display is, also replacing the yellow sleeves. These lights solder from the back.

Reinstall the LCD display and be sure there is no contamination of the contacts on the board and LCD display. Be sure to re twist the tabs on the display that goes through the PC board. The display must be tight to the PC board or the display will not work, either with missing LCD segments on or with no segments on.

Test the display by powering up the radio. If you are getting missing numbers, pull the LCD display and clean the contacts on the PC board and the display. Reassemble the radio and check the display at each major assembly point.

Reset the CPU as shown in your owners manual. This is because the CPU is located on the board you were working on and may have some bad data after working on the rig. You may have to reset the CPU when you test the rig to show the full LCD display.

Thanks to N6TR for this information

– Greg Towells

Andrews Communications Systems

ESTABLISHED 1976 ACN 001 960 752

ALINCO

Made in Japan

DX-70TH HF + 6m
100w ALL-MODE COMPACT TRANSCEIVER $1699

★ DR-610TQ	REMOTABLE TWINBANDER	$1,149
★ DR-605EA	FULL DUPLEX TWINBANDER	. .$899
★ DJ-G5EA .	FULL FEATURE H/H TWINBANDER	. .$649
★ DJ-V5EA .	WIDE-RECEIVE DUALBANDER	. .$649
★ DR-430 . .	UHF 35W MOBILE WITH 100ch MEMORY	. .$779
★ DJ-C5 . . .	CREDT CARD-SIZED H/H DUALBANDER	. .$299
★ DJ-X2 . . .	NEW H/H SCANNER	. .$499
★ DR-135TP, DJ-195 etc		. .call us
★ DJ-X20, DJ-X2000		. . . .call us

3-YEAR WARRANTY. No. 1 ALINCO IMPORTER. MASSIVE RANGE. Call us

GME ELECTROPHONE

UHF CBs

★ TX-3400 REMOTE $449
★ TX-3200 UHF, SCANS . . .$349
★ TX-4400 NEW UHF $429
★ TX-6000 UHF H/HELD . . .$479

PROUDLY MADE IN AUSTRALIA
Authorised Dealer – Plenty of Stock

UHF

★ 12 dBi vertical . .$249
★ 20 element Yagi $249
★ 6.5dBi with spring . .$79

ICOM

Made in Japan

IC-706IIG HF + 6m + 2m + 70cm ALL-MODE COMPACT TRANSCEIVER . . . Call us!

IC-756 PRO	. .call	IC-R2	.$399
IC-746	.call	ICR3	.$899
IC-775DSP	. . .call	IC-R10	.$699
IC-718	.call	IC-PCR1000	. .call
IC-207H	. . . .$749	IC-T2 2m . . .	.$299
IC-Q7	. . . . . .$299	IC-40S UHF	.$449

MORE ICOM AVAILABLE – Call us
★ NOW 3-YEAR WARRANTY ★

TELESCOPES

HIGH QUALITY BEST PRICES IN AUSTRALIA?

REFRACTORS:
70mm . . . . . .from $199
Factory direct importer – Massive range

SYNCRO AUSTRALIA

★ MAGNUM 357DX, 150W OUT $749
★ MAGNUM DELTA FORCE, 30W . . . $549
★ YUPITERU MVT7300 HI-TECH H/H SCANNER ... $649
★ ZETAGI MICS, LINEAR AMPS
★ SS30001, SP. SSB . . .$349

ALL SYNCRO AUSTRALIA PRODUCTS AVAILABLE.

DRAGON SS485H
25W MOBILE $449

KENWOOD

CALL FOR *HIGHER* PRICES!

MFJ

ANTENNA TUNERS ANALYSERS, TNCs etc
MASSIVE RANGE

UNIDEN UHF CB

★ UH-011 UHF MOBILE . . . .call
★ UH-077 SCAN MOBILE . .$249
★ UH-050XR HANDHELD . .$319
★ UH-052XR TOP H/HELD . .$349
ALL UNIDEN UHF DISCOUNTED

DIAMOND ANTENNA

FACTORY DIRECT IMPORTER
New shipmment here now – call!

ESG CD-ROM 120,000+ FREQUENCIES **$49**

MASSIVE RANGE OF USED RADIOS
★ **AOR AR-8200II SCAN** . . .$1,079

★VOICECRAFT POWER MICS★

DM451A $49	DM7600B . .$189
DM7000 . . .$169	DM 452 . . . . .$99

UNIDEN SCANNERS

★ UBC 780XLT Trunktracker .$629
★ UBC 245XLT handheld t/t . .$449
★ UBC 3000XLT handheld . . .$349
★ UBC 120XLT 100ch, h/held $279
★ UBC 60XLT 100ch, h/held $149

GARMIN GPS AT 'OLD' PRICES

eTrex $329	GPS-12 . . . .$429
GPS-2+ $579	Limited stocks

★ **POWER SUPPLIES – Call us!**
BALUNS, ROTATORS, ANTENNAS
★ **DUAL-DRIVE YAGIS, TRIBANDER**
80-10m VERTICALS, YAGIS, etc

All technical questions answered
WHY PAY MORE?

MORE INFO & USED RADIOS LIST ON OUR WEBSITE... WE WANT USED RADIOS, ETC.
http://www.andrewscom.com.au • email – lee_andrews@dingoblue.net.au

CALL (02) 9636-9060 or 9688-4301 or FAX 9688-1995

SHOP 8, 41-51 BATHURST ST., GREYSTANES, NSW 2145

Near Great Western Highway

E&OE *Why pay more?* ***MAIL ORDER TO PO BOX 240, PENDLE HILL, NSW 2145***

Some items indent. Prices subject to change without notice – limited stock, some items.

Jos Hahn of Syncro Electronics continues his series of circuits galore:

Christmas stars, Model trains and running lights!

This will be the last article about DTMF encoder and decoders. I have a request for an encoder to open internet-linked 2 metre repeaters, but I will fax that only to genuine amateur (clubs).

So far, we have used the following ICs: encoder 5089, decoder 92870, 4514, 4543 and 40106 (or MC14584). (They are all in stock at Syncro. If you would like to buy them from your local Dick Smith, we will gladly supply them).

I would like to add another old CMOS device, the 4017, a decade counter (divider with 10 decoded outputs). I call this a toy IC, as you can design model train traffic lights, Christmas stars, running lights and many, many more.

Let's look at FIG 1. If RST and INH are low and you give the clock input a positive pulse, the output numbers will go one up.

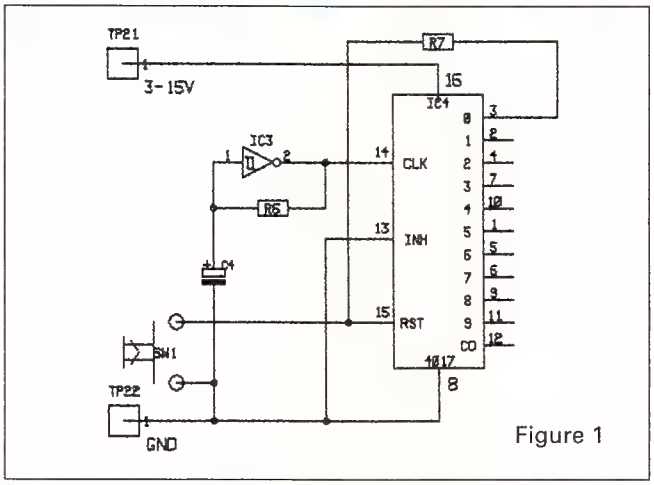


Figure 1

If RST is high, output 0 is always high and nothing moves. In FIG 1, IC3 is an oscillator, the frequency is determined by the values of C4 and R6. The clock input gets its positive pulses, and all outputs go high in sequence, but after 9 comes output 0 and the RST input will be high via R7. The IC will be locked on 0 output.

If you push SW1 longer than one clock pulse, you'll ground the RST input and input 1 will go high etc until it reaches 0 again – very simple. If you replace IC3 with an uni-junction transistor oscillator and use the outputs to set the timing, you can make a very nice traffic light!

We can use the 4017 for encoding and decoding DTMF signals. How? Not so difficult! Let's start with the decoder (FIG 2). The incoming DTMF train is A – 1 – 2 – 3 as an example. Personally, I always prefer to use as first digit strange numbers like *, #, A, B, C.

How it works: IC1, and IC2 is the normal DTMF decoder block. STD and TOE are connected, therefore only the outputs of IC2 are high during the tones. Output

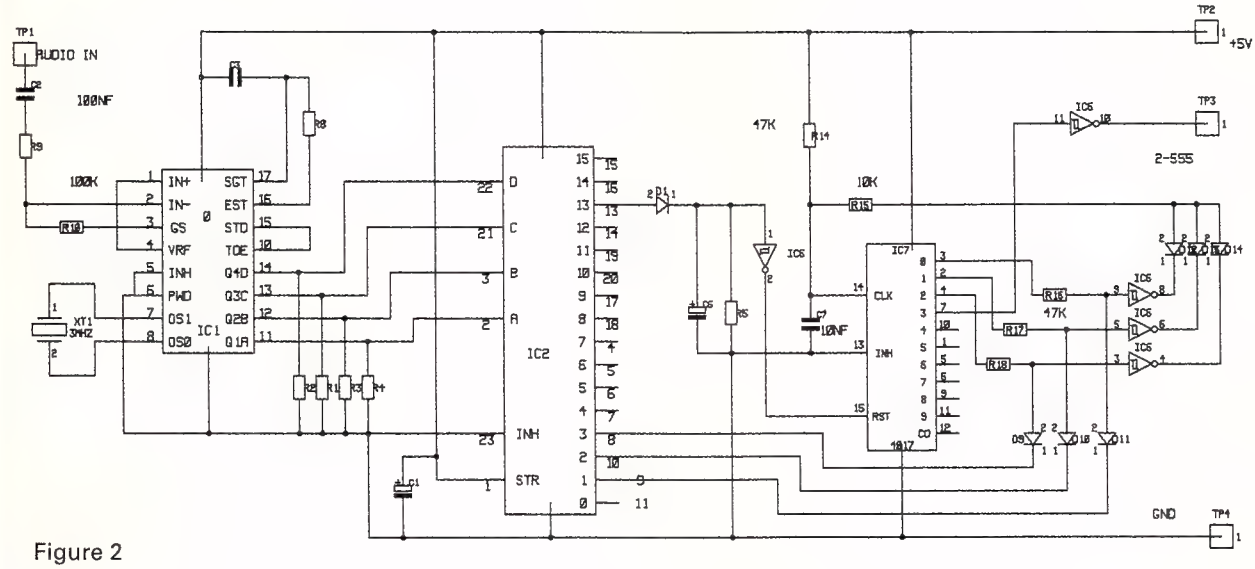
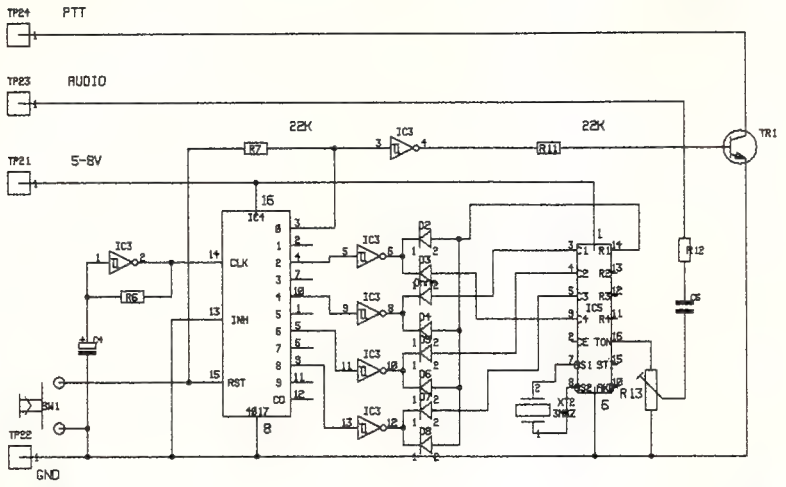


Figure 2

Figure 3



The Lucky Country...

Glad to be back in WA! Bev and I did some globe-trotting for seven and a half weeks recently – the major part was business (Yupiteru, Ranger, Magnum Palomar etc) but there was plenty time for leisure as well.

Australians do not appreciate, how fortunate they are to live in a peaceful open country. I was therefore very annoyed, when I listened to the radio on my way home from Perth Airport to hear how 'damaging' the GST has been for the economy.

What a joke!

I happened to live in the Netherlands, when GST (VAT) was introduced in the sixties and also in South Africa when it came into operation in the eighties. GST is a French invention and is considered the most honest tax, as you only pay when you consume something - and nobody is excluded.

They gave us a couple of months in South Africa to get used to the new system - no further help or support.

When we came to W.A. four and a half years ago, I could not believe what a ridiculous sales tax system was in use.

Let me explain to you: Syncro imports radios and accessories. The duty on these items was 5%.You had to pay that firstly and then we had a choice - either accept 20% profit and pay 22% sales tax on the total amount or pay only the 5% duty and the 22% sales tax later on a wholesale price.

The first way was cheaper, but it meant direct capital outlay during importation. (This is however not a problem for Syncro - money galore!)

Let's take one example. We import a base antenna with the value of $100. The landed price would be 100 + (0.05 x 100) + (0,22 x 100 x 1.05 x 1.2) = $132.72 plus transport and import charges (about $12). The total tax amount is $32.72.

If we would add $30 profit, the price in the shop would be 132.72 + 12 + 30 = $174.72.

With the introductio of the GST tax system, there is no duty any more and, making the same profit, your price would be 1.10 x (100 + 30) + 12 = $155, a whole $19.72 cheaper than before. It will only be more expensive in the case of ridiculously high profits being added on.

The industry's biggest problem is the devaluation of the Australian dollar against the US dollar. When we came to Australia in 1997 A$1 was worth US$0.75 - today it is around US$0.51.

Our petrol price is actually lower than the US, and it is about $2 per litre in the Netherlands with a 19% GST.

Please let's stop complaining and count our blessings in Aussieland!

– Jos Hahn

13 (A) is of course low, as is input 1 of IC6 and the RST of IC7 is high. This keeps output 0 of the 4017 high. Inputs 3, 5 and 9 of IC6 are also low, making the outputs high. The clock input is high through R14.

Some action now! Okay – here comes the train A-1-2-3. With A output, 13 goes high, C6 is charged and discharged via R5, but that will take long enough for the other pulses to go through. The output 2 of IC6 and the RST are low now, ready for work.

Don't forget, the clock input is high, but does not change. Output 0 of IC7 is still high, but input 9 of IC6 can't go high as D11 is connected with output 1 of IC2, which of course is low.

Digit 1 changes this state however and now Pin 9 of IC6 is high and output 8 will be low. Via D12 and R15 the clock input will go low. Digit 1 will go away and during the pause the CLK input goes high again. Jolly nice indeed – the 4017 says and goes one up from output 0 to output 1. Now digit 2 comes in and the whole cycle will start over again. If all digits are decoded, output 10 of IC6 will go low and could trigger a 555. A very sweet circuit indeed.

You can also use the 4017 with an encoder (FIG 3). It is very much the same circuit as FIG 1 with a 40106 and a 5089 added.

The working is very quickly explained: output 0 is kept high through R7 and the RST input. If the RST input is active all outputs will go high in the normal order 1, 2, 3, 4 etc. As soon as output 0 is low, output 4 of IC4 will keep the PTT low via TR1. Output 1 is not connected – this will give the transmitter some time to go on. Output 2 will create tone A (R1-C4), output 4 tone 1 (R1-C1) output 6 tone 2 (R1-C2) and output 8 will make tone 3 (R1-C3). I have hardwired this encoder to go with the decoder of FIG 2

Now the last one in the DTMF club. This is a very proven DTMF encoder – thousands were made and used. Originally I designed this circuit in the early nineties as a battery-operated alarm transmitter. It was in an aluminium case with a VHF 5 watt transmitter, battery, charger and rubber duck antenna.

We did make a PC board for it obviously and Syncro will make a kit with all the parts. I will give you the total circuit (FIG 4). But you can omit a few parts, if your application is different. As it is, it is a 4 digit encoder, programmable with solder pads and includes a voltage sensor circuit.

In this circuit I have added TR4 and R20 to get a low going PTT. This is not on the PC boards – the original radio used

needed a positive voltage. The trigger input (TP2) needs a 5 volt positive voltage to get the thing running. This can be SW1 or any other switch, like door contacts, infra red sensor etc.

If TP2 is kept permanently high, the transmitter will be triggered over and over again, but you will determine the intervals.

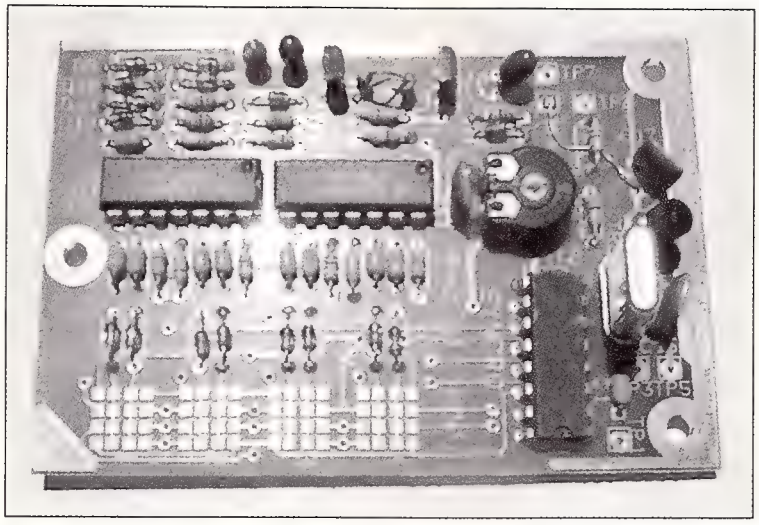
How it works: C4 is charged by the trigger voltage and output 2 of IC1 will be low, via TR1 and TR4 the transmitter is switched on. R4 and C3 will delay the start of the pulse train to give the radio the time to be in decent TX mode. Output 6 of IC1 now goes high and so will input 9 of IC1 for the RC time C6-R9. Output pin 8 goes low and you can program the desired tone by soldering the solder pads to D1 and D2.

Pin 8 goes high again, so will input 11 of IC1 – the shorter RC time will be set by C7 and R10, during that pulse, the output 10 will be low and then goes high again, triggering C8.

These are our pauses during the tone encoding . As it is, we are making 4 digits, but you can also create a 3 digit switch on and 3 digit switch off, by putting a double toggle switch, disconnecting D6 and D8.

If D6 is in the circuit, D8 is out and the other way around. The first two digits are always the same, but you could use the third digit to switch on and the fourth for off.

Every time we encode a tone, the RC times are a bit longer – actually 100nF and 1M5.



An example of a finished unit.

The last pulse will make output 10 of IC3 low. Tr3 will charge C12, a big 10uF cap. Output 6 of IC3 will be low and D16 will keep input 1 of IC1 low as well. This is in case the trigger input stays high.

As soon as C12 is discharged enough, the encoder will start again. You determine the time by cutting either R15 or R18. When you use something like SW1, you can leave C14. R19, R17, T13, R15, C12 and D16 out. TR2 is a low power 5 volt regulator.

If the battery is not charged anymore, the 5 volt will drop. The power supply to IC1 is also going lower.

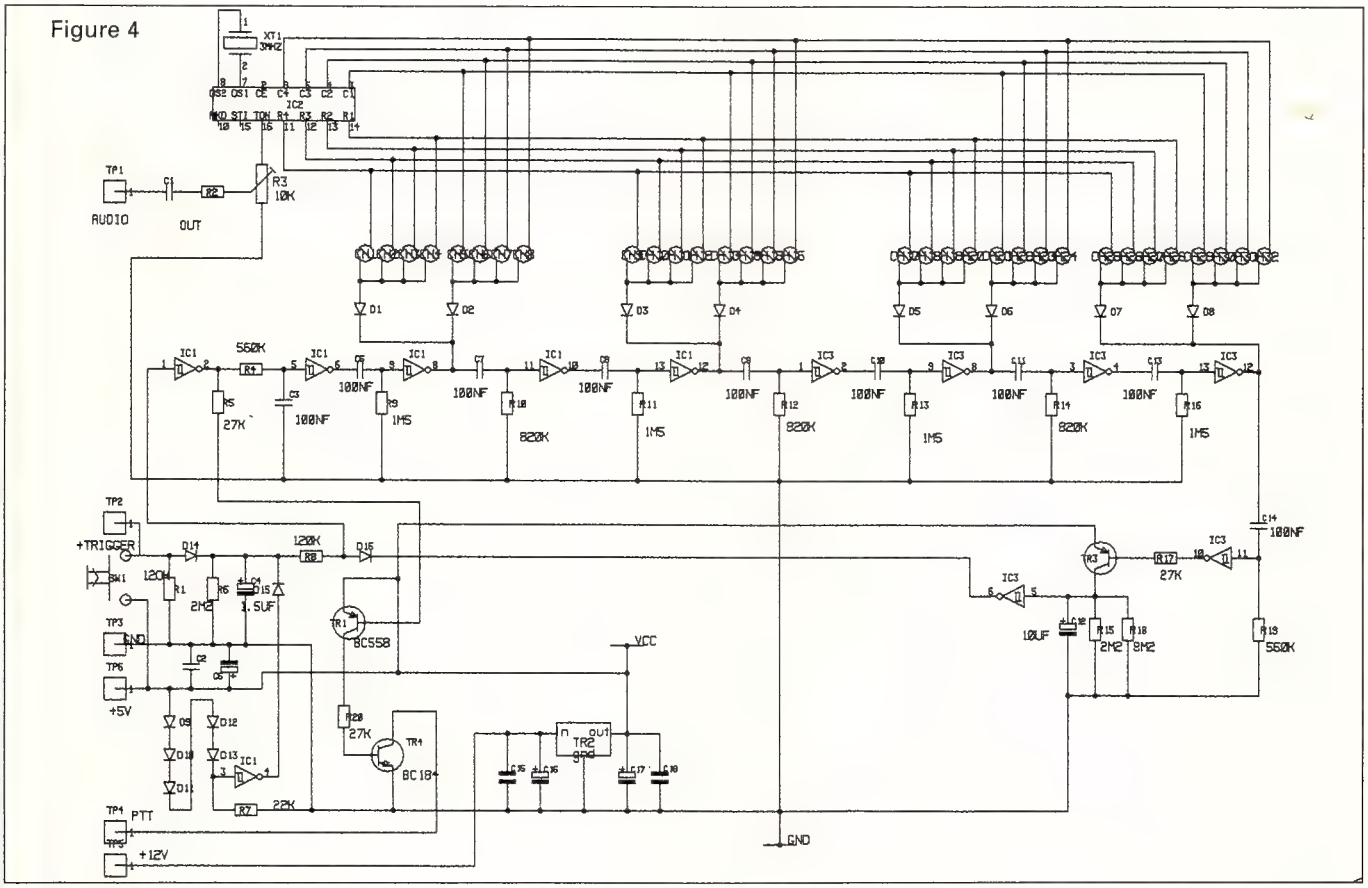
Eventually the output 4 of IC1 will go high and switch on the encoder (on its last legs of course), you can leave all these parts out as well, if your application is different (D9-10-11-12-13-R7).

You can e-mail Jos@syncroelec.com.au or fax 08 92919984 me for advice on which circuit to use for your special purpose.

Next month I will start with frequency mods, but will firstly explain how a radio works

Till then, Jos.

Figure 4



Use the Internet: E-mail your Classified to lenshaw@eck.net.au

Radio and Communications

Incorporating AMATEUR RADIO ACTION and CB ACTION

Amateurs, CBers and hobby communicators of all kinds are invited to place a FREE classified in this section of the magazine. Amateur gear, CB radios, scanners, antennas, computers, wanted or for sale items, power supplies ... it's all fair game. Note our policy, however, that readers who do not hold an amateur qualification may not advertise to purchase amateur transmitting equipment. So dust off that old relic and get busy with the pen. Your first 25 words are FREE, then it's just $5 per 25 words after that. Adverts must be clearly PRINTED. Please read and note the conditions below.

Use the Internet: E-mail your Classified to lenshaw@eck.net.au

Readers of **RADIO and COMMUNICATIONS** may use the **CLASSIFIEDS** column to the extent of 25 words absolutely free! This offer applies only to private 'For Sale' or 'Wanted' classified listings, and to computers, software or computer peripherals and other hobby communications equipment — scanners, amateur or CB transceivers, etc.

A **limit of one classified** advertisement applies to each advertiser. **Any additional words must be paid for or the advertisement will not be accepted.** A nominal fee of $5 per additional 25 words or part thereof will apply. This fee should accompany your material if applicable. Please enclose this fee or your advertisement will not appear.

Your advertisement's **inclusion cannot be guaranteed**, but every effort will be made to place your advertisement in the issue following receipt of copy. The 25 words **must include your name and phone number.**

The publisher reserves the right to amend or reject any advertising material considered unsuitable for publication. No correspondence will be entered into.

DO NOT SEND TWO SELL FORMS. ONLY ONE AD WILL BE RUN!

Repeat CLASSIFIEDS advertisements will be accepted for a fee of $5 for every 25 words — *including* the first 25. Once again, this fee should accompany your material.

Advertisements for **commercial goods** or services will not be accepted for publication in these classifieds pages. This classified section is for **private sales/purchases** only. **E-mail submissions to lenshaw@eck.net.au are preferred.**

For details of **display advertising** elsewhere in the magazine phone our **National Advertising Manager, Len Shaw on (03) 57 992 943**

Readers should note that all advertisements are required to comply with the provisions of the Victorian Consumer Affairs Act of 1972. They should be aware that, under the above Act, Post Office box numbers can be published **only if the full name and residential address** of the box holder is supplied with the advertising material. Our fax number is (03) 57 992 979

This form is to be used for all classified advertising material in RADIO and COMMUNICATIONS. Letters or faxes on plain paper requesting the insertion of a classified advertisement will not be accepted.

Clip this form and post it to:

R and C Classifieds
PO Box 887
Seymour
Victoria 3661

We prefer email! Send your classified to lenshaw@eck.net.au

IMPORTANT NOTICE: Unsuitable material includes advertisements for wanted amateur transmitting equipment where no valid amateur call sign is shown, 'for sale' equipment modified for general coverage transmit, etc.

ONE WORD PER BOX! **Deadline: September issue *Aug 10 2001***

FREE PAY $5

BELOW IS NOT FOR PUBLICATION, BUT THE DETAILS MUST BE COMPLETED OR YOUR CLASSIFIED *WILL NOT RUN*

Your name: *Amateur call (if any):* ***VK***

Residential address: *Phone contact*: ( )*

State *P/C*

Your signature: *Today's date: / /*

* This number is for the editor's use only — to check any details. State if business or after hours number. *NOT* for publication!

Scott McClements writes on

11m ANTENNA BASICS

Part One

To understand how an antenna works you must first have a basic idea of the makeup of a radio wave.

RADIO WAVES

Radio energy waves are similar to light waves. In fact, signals (radio waves) travel through the air at nearly the speed of light.

To understand how an antenna works you must first have a basic idea of the makeup of a radio wave.

A radio wave can be visualised as a sine wave, shown in Figure 1. The distance a wave travels to complete one cycle is known as the wavelength of the signal. A CB signal completes a cycle as it travels about 11m (36ft).

Since we have defined wavelength as the distance a wave travels to complete one cycle, we now know that one wavelength on CB frequency is about 11m.

So, radio waves are similar to light waves?

What is the wavelength of visible light? About 5.1cm. Figure 2 shows the relationship of CB frequencies to other bands.

HOW ANTENNAS WORK IN GENERAL

When your transmitter puts a current (radio frequency (RF) energy) into the antenna, it responds by producing a magnetic field surrounding itself. This is the signal.

When this magnetic wave strikes another antenna (the receiving station antenna), it induces a current on the receiving antenna surface, which is then converted by the station's receiver to sound.

The length of the antenna structure plays an important role. The magnetic field that your antenna puts out will produce an electric current on any metal surface it strikes, however if the metal that the signal strikes has a length in relation to itself, the induced current will be much stronger on the object.

We stated before that as a CB signal travels through the air, it completes a cycle in about 11m. So if the object that the magnetic wave strikes is 5.5m (1/2 wave length), 2.75m (1/4 wavelength) or 11m (a full wavelength), then the induced current will be much higher than if the signal struck a metal object that was not some appreciable fraction of the wavelength of the signal.

If you have heard people say they want to "tune" their antenna, they usually mean make it have a length which relates to frequency they are trying to receive. This has a special name, it as known as antenna resonance.

Every antenna has at least one exact resonance point. Antenna resonance is the frequency (in MHz) where the antenna is in a state of electrical balance, which is determined by the length of the antenna (every antenna has an exact resonant frequency).

To demonstrate what we are describing here, let us look at a very simple formula. You can calculate the distance of a wavelength in free space for any frequency using this formula:

One wavelength, in metres = 300/frequency in megahertz (MHz). Let's look at an example: CB channel 40 uses 27.405MHz. One wavelength for 27.405, 300/27.405 = 10.944m (35.906ft).

So we want to make an antenna that is resonant on channel 40 and not too large. Let's cut a straight piece of aluminium rod to be half a wavelength long, 5.47m (17.953ft) and we have made an antenna that resonates on 27.405 (or close to that), perfect for channel 40.

Now let's look the most basic antenna most CBers are familiar with, the 2.73m (about 102in) whip, known as the 1/4 wave. If we consult our calculator, 2.73m is about 1/4 of 10.944m (one wavelength). This antenna should also perform well on the CB band because its length relates to that 11m-wavelength signal we are trying to receive.

To further simplify things, we have been speaking strictly about receiving - but these same principles apply to transmitting. Our antenna also transmits a stronger signal if the antenna we are using is resonant on the transmitting frequency.

Tech Tip: Use a device called a grid dip oscillator to determine the resonant frequency of an antenna.

BANDWIDTH

This brings us to our next topic - bandwidth. Most of us use more than one frequency, so, does this mean our antenna only works well at the resonant frequency?

No. Our antennas perform well over a range of frequencies. Most commercial CB antennas are designed to operate well over the 40 channels, a frequency range from 26.965-27.405MHz. If you use all frequencies, it would be best to make the antenna resonant in the middle, around channel 20(27.205MHz). If you talk mainly on one channel then set it up for the frequency you use most.

The term that is important here is bandwidth or how much band your antenna will work well over. For example if your antenna performs well over the 40 channels, then your bandwidth is 27.405-26.965MHz, or 0.44.

One method of judging how efficiently your antenna is working is by measuring SWR.

SWR

To understand SWR or Standing Wave Ratio, we must first understand a few other properties all antennas have. You may have heard the terms 'radiation resistance', 'impedance', 'input impedance', and 'feedpoint impedance'. These terms are all referring to the same property of an antenna.

When we think of the term 'resistance', we usually think of some force that impedes. Do not confuse DC resistance with radiation resistance. You cannot measure your antenna's impedance by using an ohm meter. Impedance in antenna terms refers to the ratio of the voltage to current, both present on an antenna, at any particular point on an antenna. This ratio of voltage to current varies on different parts of the

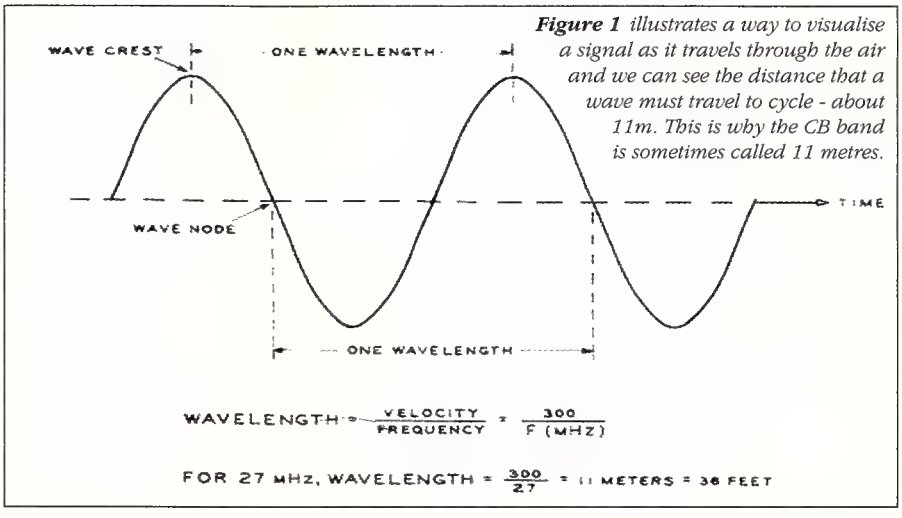

WAVE CREST
ONE WAVELENGTH
TIME
WAVE NODE
ONE WAVELENGTH
WAVELENGTH = VELOCITY / FREQUENCY = 300 / F (MHz)
FOR 27 MHz, WAVELENGTH = 300/27 = 11 METERS = 36 FEET

***Figure 1** illustrates a way to visualise a signal as it travels through the air and we can see the distance that a wave must travel to cycle - about 11m. This is why the CB band is sometimes called 11 metres.*

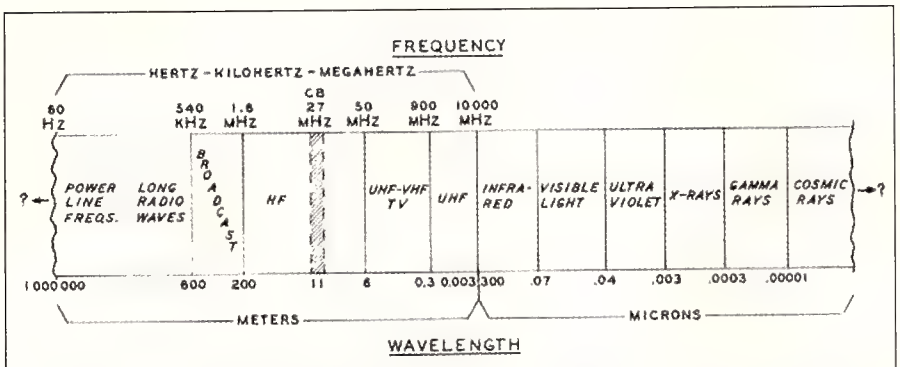


Figure 2 *- A chart to show the relationship between the CB band and others. On the left the chart starts out with power line frequencies (60Hz), AM Broadcast (1MHz), the CB band (27MHz) and goes all the way up through TV, FM radio, cellular phone, microwave to visible light frequencies. Lower frequencies have long wavelengths and high frequencies have short wavelengths.*

antenna - which means that the impedance also varies.

In formula terms: Impedance of antenna = voltage field/current field flowing within the antenna.

Tech Tip: You can measure the feedpoint impedance of an antenna by using a device known as a noise bridge.

This is great, but how does this relate to SWR? As you may be aware of, most antennas are designed to have an impedance of 50 ohms at their feedpoint. CB radios have antenna sockets that require a 50-ohm load - usually your antenna. This is why we use a 50-ohm feedline to connect to the antenna.

If we have an antenna not tuned close to 50 ohms or we used 75-ohm coax instead of 50-ohm coax, a mismatch occurs.

Basic laws of electronics dictate that if the impedances of the antenna socket, coax and antenna do not match then maximum power is not transferred from the radio and out of the antenna. There are many situations which could cause a mismatch - squashed coax, bad connections, incorrect antenna assembly, mistuned antenna (incorrect antenna length) and objects too close to the antenna are some other common causes.

What happens if there is a mismatch? Let's assume the antenna isn't tuned correctly. At the connection of the coax to the antenna, part (or all) of the signal is reflected back down the feedline. The amount of the wave reflected depends on the extent of the mismatch.

The combination of the original wave travelling down the coax (towards the antenna or the opposite during receive) and the reflecting wave is called a standing wave. The ratio of the two waves is known as the standing wave ratio (SWR). Generally, you want a low SWR, preferably less than 2:1. In some mobile installations note that it is not possible to get the ratio lower than this without using a special matching device. This is because the impedance of most mobile antennas is lower than 50 ohms.

In general, an SWR of 1:5 is fine, but this is an area of conflict for most antenna experts. Some strive to achieve a 1:1 ratio that indicates a maximum power transfer through their antenna system.

The real world performance differences between a 1:1 SWR and a 1.5:1 SWR are neglible, however.

Tech Tip: You can use a device known as an SWR bridge to read the SWR of your antenna system. Most high-end radios have an SWR meter already installed. If your radio does not have one, they are inexpensive and fit into the feedline between your radio and the antenna.

BACK TO BANDWIDTH

How can you use SWR to determine the bandwidth your antenna?

You can plot your SWR reading, similar to that in Figure 3. Generally for base antenna use, an SWR of more than 2:1 indicates that the antenna system is no longer performing efficiently - so the amount of band you can cover while keeping a SWR under 2:1 is considered your antenna's bandwidth.

You should centre your lowest SWR reading on the channel you use most, or around channel 20 if you use them all.

A few factors determine the bandwidth of an antenna. One of the main factors to keep in mind is conductor size of the antenna. For instance, if you made an antenna from wire, it would have less bandwidth than if you made it from larger tubing. The outside diameter is the primary concern. RF energy on 11m travels on the "skin" or outside of the wire only. Another advantage of using a larger conductor is that it increases the amount of transmit power it can safely handle.

Larger-sized elements (tubing or wire) do not provide more gain. Thicker elements only serve to widen antenna bandwidth and increase the power handling capability of an antenna system.

THE 1/2 WAVELENGTH DIPOLE ANTENNA

When the first radio experimenters were trying out their equipment, they would connect their transmitters to long, high pieces of wire. It was discovered that relating antenna length to the frequency being used resulted in an antenna that worked many times better than random lengths.

One of the first resonant antennas discovered was the 1/2-wave dipole, pictured in Figure 4.

If you wanted to make a dipole antenna to use on the 11m band (CB), you would just make each leg a 1/4 wavelength, right? Almost. We previously looked at wavelength if the signal was travelling through the air. In other mediums - metal tubing, wires, the earth or coax, the wave travels slower. However, the wave still completes its cycle in the same amount of time, but didn't travel as far. In other words, the wavelength of a signal is shorter when travelling through wire, coax and your antenna. This is not a major concern, just be aware that is why the formula is adjusted.

A half wavelength in metres = 142.65/frequency in MHz. For channel 40 (27.405MHz) 142.65/27.405 = 5.20m (about 17ft). Each leg of the dipole would be a 1/4 wavelength or 5.20m/2 = 2.6m (8.5ft).

IMPEDANCE

We are going to use a half-wave dipole antenna to demonstrate other properties of antennas.

First, let's examine the impedance of this antenna. If you place the connection in the middle, you have a feedpoint impedance of about 70 ohms at its resonant frequency. As you can see, using this antenna, you are already looking at a SWR no lower than 1:3:1 because of the mismatch of mating 50-ohm coax to a 70-ohm antenna.

The bandwidth of this antenna is largely dependent on the outside diameter of its elements Let's introduce a new, important antenna property, its radiation pattern, also known as polar plot or near-field pattern.

RADIATION PTTERN

Figure 5 shows the radiation pattern of a dipole antenna from above.

A radiation pattern is a visual representation of how an antenna concentrates its signal. The plot of the 1/2 wave is shaped like a figure 8. This antenna has 'gain', that is, signals coming from the front and rear are stronger than signals coming from the ends.

Often misunderstood by radio operators, antenna gain indicates the increase in power of one antenna (when transmitting or receiving) compared to another.

Gain is a ratio of power levels and is stated in decibels (dB).

How do we use this number? Keep in mind I said "indicates the increase in power of one antenna compared to another antenna", so, how much gain does your antenna have compared to say, a coat hanger?

Probably a lot. We know that a coat hanger would not be much of an antenna.

When using dB gain to rate an antenna you must know what the reference antenna is. It is important to note that antennas are passive, they do not "amplify" signals (or effect transmitted audio levels.), they merely re-distribute the power they get to achieve gain. They have no effect on the "modulation" or audio quality of your radio.

Now, knowing something about the

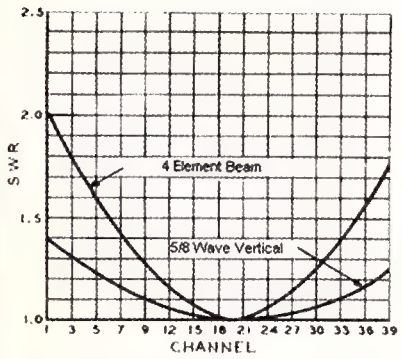


Figure 3 *shows how to chart your antenna's SWR. Make a similar grid, then take a reading on channel 1, and record it. Do it for each of the channels. This is a good way of looking at your antennas bandwidth. The graph shows sample readings that you could expect from a four-element beam, and a 5/8-wave antenna.*

dipole, one of the most basic antennas, we can use it as a comparison. If someone said, "it has "6dB gain over a dipole" or "6dB, reference antenna is a dipole", it would have factual meaning.

Let's look at two radiation patterns at the same time, to see how one antenna achieves gain. It will become obvious how it works once you see it - check it out.

There is another "antenna" used to calculate gain - the isotropic radiator, an antenna that exists only in theory.

If we visualise the radiation pattern in 3D, we can see this antenna is radiating equally well in every direction. It is even transmitting straight down, straight up, all with the same intensity. You could picture it like a perfectly round ball. The signal emanates from the antenna, which would be located at the exact inside centre of the ball, equally well in all directions. On planet Earth however, this is not possible. The effect of the ground and other objects alter the radiation pattern of antennas, and even if we made an antenna to radiate like this, it would never work unless we took it to outer space where there would be no objects to interfere with it.

Since it does not favor any particular direction, an isotropic radiator has a gain of zero. So even our lowly dipole has gain over an isotropic radiator. Reliable sources say that a dipole has 2.1dB gain over an isotropic radiator. Then, if I tell you I have an antenna that has 6dB gain over an isotropic radiator, you know also that it has 3.9dB over a dipole.

Great - so, how can we use this gain? The rule of thumb is that for every 3dB of improvement you add to your antenna, it results in an effect noticeable to stations receiving the signal. Any less than 3dB indicates an improvement that is not appreciable, but do not discount gain improvements under 3dB - sometimes 0.5 of a dB means hearing or not hearing a station.

Let's look at an example. Say your antenna has 9dB gain over a dipole. You really want to get a new antenna that is advertised as having 12dB over an isotropic.

Really, you're not going to see an improvement because we know that the advertised antenna really has a gain of 9.9dB (12 - 2.1) compared to a dipole. Therefore, an improvement of 0.9dB for the new antenna is not a worthwhile gain especially if the new antenna is costly. A word to the wise ... use manufacturers' stated antenna gain figures cautiously, it is better to figure out the antenna design (what specific design) then consult an antenna handbook to determine the correct gain figure.

When you examine gain figures, manufacturers should be stating a reference antenna. Usually if the gain figure is measured against a dipole, you will see the gain stated as "dBd", and "dBi" for gain over an isotropic.

Another way to increase your relative gain by 3dB in all directions only on your transmitted signal is to double your output power.

We are not comparing antennas here, but this 3dB is an improvement compared to our original signal running half the wattage. Now, you might be transmitting further, but your receive range is unchanged. You could actually "out-talk your ears", meaning people can hear you but you cannot hear them.

High-gain antennas improve both transmit and receive capabilities.

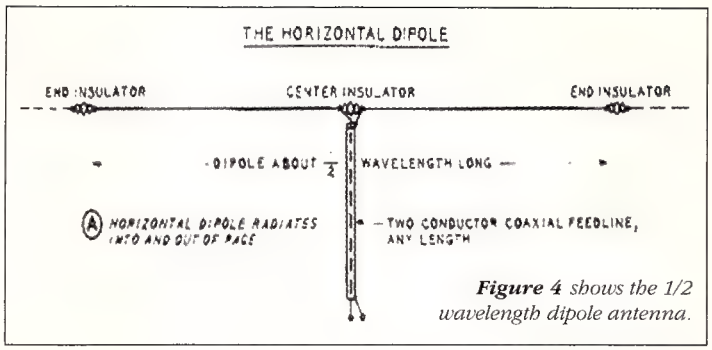

THE HORIZONTAL DIPOLE
END INSULATOR
CENTER INSULATOR
END INSULATOR
DIPOLE ABOUT 1/2 WAVELENGTH LONG
A HORIZONTAL DIPOLE RADIATES INTO AND OUT OF PAGE
TWO CONDUCTOR COAXIAL FEEDLINE, ANY LENGTH

Figure 4 *shows the 1/2 wavelength dipole antenna.*

An example; if you are running 20 watts, you would need to jump up to 40 watts for anyone to hear any difference (a 3dB improvement). As you can see, once you are running higher wattage - more than 100 watts - you must make large increases for other stations to notice a difference.

Not only is this a bad idea because it gets expensive, it is not necessary when using a good antenna. How is this possible? If you are using 500 watts and you would like to get a 1000-watt amplifier, you could alternatively use an antenna that has 3dB more gain than your current antenna and achieve the same effect, a signal that is louder to the receiving station. Unfortunately, antenna technology on the HF bands has not improved all that much over the years. Antennas are constructed better today and optimised for the best performance, but many of the antennas used in the 1970s are still the best.

Tech Tip: You can measure the radiation pattern of your antenna by using a device known as a field strength meter.

POLARISATION

The last fundamental theory we must understand is polarisation. Do not be scared off, this theory was not saved until last because it was more difficult to understand. It is just as easy as any of the other concepts.

A radio wave consists of two fields, one electric and one magnetic. These two fields are perpendicular to each other, as shown in Figure 7.

The sum of the two fields is called the electro-magnetic field. Energy is transferring back and forth from one field to the other, this is known as "oscillation". We are primarily interested in one field - the electric field.

Its position and direction with reference to the ground determines wave polarisation. With horizontal polarisation, the electric field is parallel to the ground; vertical polarisation occurs when the electric field is perpendicular to the ground. In general, the electric field is on the same plane as the antenna's element(s), so if the antenna is vertical, then the polarisation is vertical.

The horizontal dipole in

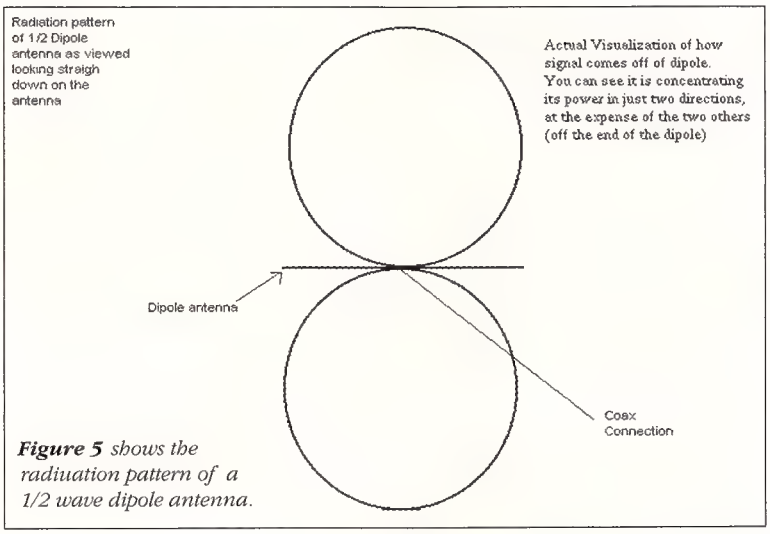
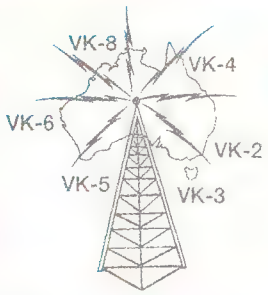

Radiation pattern of 1/2 Dipole antenna as viewed looking straigh down on the antenna
Actual Visualization of how signal comes off of dipole. You can see it is concentrating its power in just two directions, at the expense of the two others (off the end of the dipole)
Dipole antenna
Coax Connection

Figure 5 *shows the radiuation pattern of a 1/2 wave dipole antenna.*



AMATEUR TRANSCEIVER RADIO CENTRE

CREATE ROTATORS – DIAMOND ANTENNAS – GAP

Check out our web site for latest weekly specials

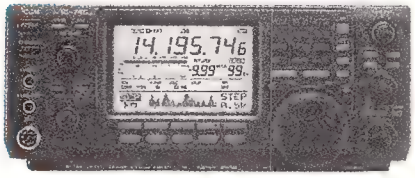
KENWOOD
Authorised Dealer

Alinco, Australia's No.1 Factory Direct Importer - AUTHORISED DEALER.
Massive monthly stockist – Best Prices. New DJ-V5E 6W, DR-601E, DX-70TH, DJ-X10E.
AUSTRALIA'S FIRST ARRIVALS!
Genuine export models. 3 Year Warranty.
Professional service and advice.

TS-2000 Now available

"The transmitter appears to have just about everything you could ask for"

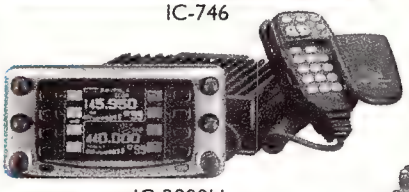
– Len Shaw, Editor, Radio & Communications Magazine, TS2000 Review, May 2001


IC-746

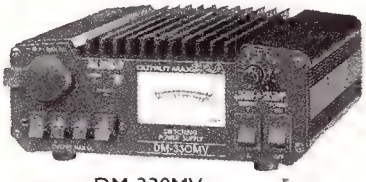
TH-G71A

TH-D7E

DR-605T


IC-2800H

AR-8200


DM-330MV

AMERITRON

TS-50S

BUTTERNUT

DJ-X10E

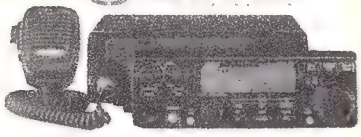
DJ-G5

DJ-C5

DJ-195

DJ-V5E

cushcraft


DX-70TH

ALINCO
Authorised Dealer

DR-610

141 Gilba Road
Girraween NSW 2145
email:ard@bytelink.com.au
web: http://users.bytelink.com.au/ard

Ph 02 9896 2545

Fax 02 9636 6699

Figure 3 is horizontally polarised. In Figure 8, a vertical arrangement for a dipole, its polarisation is consequently vertical.

It is important to note that the 1/2 wave dipole in a vertical position has a different radiation pattern (and consequently different gain over an isotropic) than the 1/2 wave dipole in the horizontal position. When most people talk about a dipole, they usually mean a 1/2-wave dipole in the horizontal position.

HORIZONTAL OR VERTICAL

Waves do not have to be either horizontal or vertical. This is merely an arbitrary set-up. Antennas are arranged like this so that others can orient their antennas in a similar matter.

The terms horizontal and vertical are in reference to the earth's surface. Take away the ground, say go into outer space and these terms would have no meaning.

This is why we arrange our antennas for either horizontal or vertical polarisation. For instance, if the receiving antenna is receiving a signal that does not have the same polarisation as itself, then the signal is reduced by about 20dB (almost seven times) compared to a signal with the same polarisation.

Some operators turn their beams at a 45-degree angle, trying to achieve an in-between polarisation, an old trick that sometimes works well.

The thing is, as our signals travel they usually reflect off objects, and the field can change polarisation. Therefore, your signal may end up loud and clear to another station even if you are not using the same polarisation as each other. The signal may be bouncing off some object (a water tower for example) that might be flipping the polarisation before it gets to the other station. More people choose horizontal polarisation for DXing because receiving is generally quieter. This is because most man-made noises (interference) are usually (but not always) vertically polarised. There is no proof that horizontal waves are better for "skip" signals.

There is one special polarisation, known as circular polarisation. It should be of special interest to antenna experimenters.

As the wave travels, it actually spins, not maintaining a set polarisation but covering every possible angle in-between. This is good, because it helps reduce signal fade and flutter during DX contacts. It can either be right or left-handed circular polarisation depending on which way it's spinning (think of it spinning clockwise or counter-clockwise as it leaves the antenna).

In conclusion, we have covered a lot of antenna theory here. I arranged it to flow as logically as possible and I have also simplified several issues, so that you could get ideas quickly. It might be necessary to go back and re-read this section to thoroughly understand it. If what you read was really interesting and you want to know more, there are several books you can read.

Antennas are like cars; some folks want to have the best (me included). It pays to learn all the antenna principles.

These books are essential reading:

The ARRL Antenna Handbook, any edition - http://www.arrl.org/catalog/.

The Truth About CB Antennas, William Orr, W6SAI - http://www.amazon.com/

Part two next issue (September).

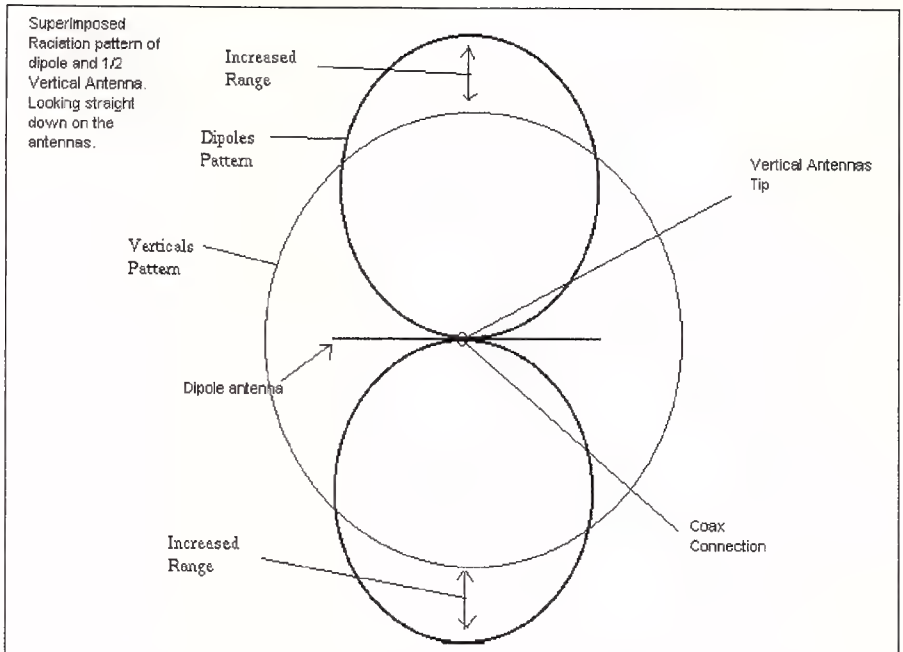


Figure 6. *You can see that the dipole antenna concentrates it signal, making it stronger, in two directions. The vertical on the other hand, spreads the signal evenly, resulting in a weaker signal, but with even coverage. The increased range comes from the dipole having gain over the vertical.The dipole uses energy off its sides and puts it into the two main lobes (th two parts of the figure 8 pattern) You can see how gain translates into better signal range, by looking at the "increased range" marking on the diagram.*

BIBLIOGRAPHY

Author: Richard C. Johnson
Title: Antenna Engineering Handbook, 3rd Ed.
Publisher: McGraw-Hill

Author: William I. Orr, W6SAI, & Stuart D. Cowan, W2LX
Title: Antenna Handbook
Publisher: Radio Amateur Callbook

Author: William I. Orr, W6SAI, & Stuart D. Cowan, W2LX
Title: Beam Antenna Handbook
Publisher: Radio Amateur Callbook

Author: Bob Haviland, W4MB
Title: The Quad Antenna: A Comprehen sive Guide to the Construction, Design, and Performance of Quad Antennas
Publisher: CQ

Author: William I. Orr, W6SAI, & Stuart D. Cowan, W2LX
Title: Cubical Quad Antennas, 3rd Ed.
Publisher: Radio Amateur Callbook

Author: Editors of 73 Magazine.
Title: The Giant Book of Amateur Radio Antennas
Publisher: Tab Books

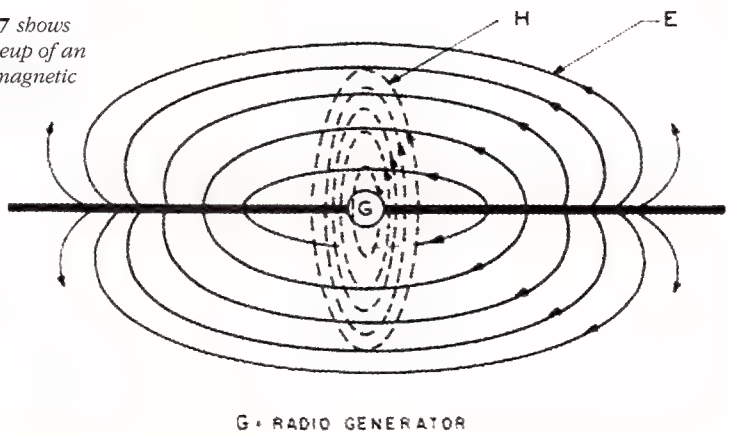
Author: William I. Orr, W6SAI, & Stuart D. Cowan, W2LX
Title: The Truth About CB Antennas,2rd Ed.
Publisher: Radio Publications

Author: R. Dean Straw, N6BV, Ed.
Title: The ARRL Antenna Book
Publisher: ARRL

Author: —
Title: The ARRL HandBook
Publisher: ARRL

Part of this listing was compiled L. B. Cebik, W4RNL

Figure 7 *shows the makeup of an electro-magnetic field.*



Is it really worth the effort.?

HOW ACCURATELY MUST WE AIM A BEAM?

By **L B Cebik** W4RNL

We may divide the question of beam aiming accuracy into two parts: how accurate we can be and how accurate we must be.

HOW ACCURATE CAN WE BE?

The accuracy with which we can aim a directional beam array depends largely on two factors.

1. The accuracy of the beam assemblies initial alignment:

A beam's initial direction depends upon the heading on which we lock down the boom and mast within the rotator and upon the accuracy of the rotator's registry of that direction. Consequently, some installers go to great pains to establish the direction of true North and the departure of the beam from that bearing at the point of installation. Once these values are known, the rotator indicator is also set to this heading. Presumably, when everything is set, we lock down the system. The heading will at least be accurate when the beam is pointed in this initial direction.

2. The accuracy of the beam heading indicator, normally as registered on the rotator control box meter or translated into a computer numerical value. Regardless of the readout system, the accuracy of the heading indication depends upon the accuracy with which the indications system follows the changes of heading relative to the initial alignment. Many rotator systems use a potentiometer in the rotator motor assembly housing, along with a control voltage from the control box.

A perfectly linear potentiometer with no dead region at either end of the turning circumference would provide a very accurate indication of the departure of the beam heading from the setting at initial alignment. However, accurate the circuitry for translating the voltage returned by the potentiometer to the control box, the potentiometer itself has an accuracy limit, normally expressed as a potential range of error.

A +/-1% error range would translate into a +/-3.6-degree range of heading error.

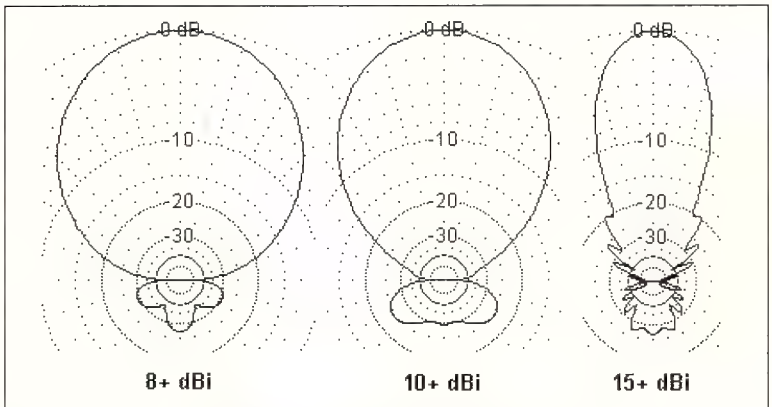
Given the environmental stress under which such potentiometers operate - in terms both of temperature and humidity extremes and of the motor and gear operation - it is dubious that even a 1% potentiometer would long uphold that level of accuracy. We have presumed that the circuitry that translates the incoming voltage from the potentiometer has no error, an unsafe assumption to be sure. Taking all possible sources together, it is unlikely that a rotating system using a potentiometer in the rotator motor housing and standard sorts of indicator circuitry will be better than +/-3% accurate (and possibly less accurate).

This accuracy percentage translates into a possible error of up to +/-10.8 degrees.

The error is likely to be variable across the horizon in several ways. First, the error level may shift with the bearing. Second, the error level may shift with the direction of rotation, as the wiper contact changes direction. Third, the error level may shift with changes in temperature and humidity. Fourth, the error level may shift with time and the changing conditions of operation of the potentiometer - not to mention the rotator control box indicator circuitry. It is not difficult to resolve the voltage returned by the indicator potentiometer down to several decimal places. Translating this voltage into beam headings in tenths of a degree - as read out on a numeric display - is also routine.

However, since the basic accuracy of the return voltage is subject to so many potential error-inducing factors, such a display would be more a satisfying illusion than a true registry of the beam's actual heading. Obtaining a more accurate readout of the beam heading would require an independent measurement system. One such system would include a self-correcting sensing and indicator system of true North or some other preset bearing. It would then measure the difference between the known or reference bearing and the beam heading, possibly taken by real or virtual measurements of the boom vs. the preset heading.

Laser interception of the boom and a fixed reference bar could easily achieve 1-degree accuracy for the beam system. However, for almost all installations, the cost would be prohibitive. Likely, it would also require alignment before each use. In the end, the bulk of amateur operations will have to be satisfied with an accuracy of beam heading read-out somewhere in the +/-1 to +/-5 percent region.



Gain vs. Beamwidth: The General Trend
The Higher the Gain, the Narrower the -3 dB and -0.5 dB Beamwidths

Fig. 1

HOW ACCURATE MUST WE BE?

The answer to our second question depends upon several factors regarding the beamwidth of directional antennas. Most amateurs

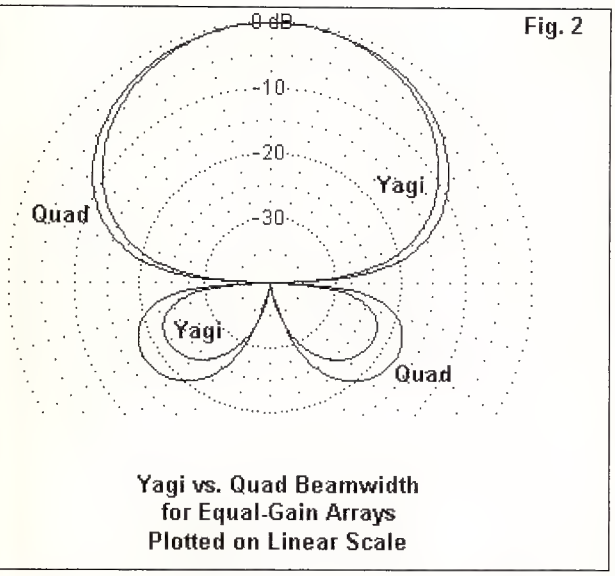


Fig. 2

Yagi vs. Quad Beamwidth for Equal-Gain Arrays Plotted on Linear Scale

are familiar with the registration of antenna beamwidth in terms of half-power or -3 dB power points.

Relative to the bearing of maximum forward gain, we may obtain a beamwidth in degrees by determining the bearings on either side of the maximum gain heading at which the gain decreases by 3 dB. However, the -3dB beamwidth is too broad for those types of operation most concerned with maximum precision of beam heading readouts. No standard beamwidth currently exists to evaluate the question at hand. Therefore, solely for the sake of discussion and with absolutely no pretense of adoption, I shall create a standard. For standard voice and CW operation, a drop in gain of 0.5 dB is too small to detect. However, for some of the newer modes of operation, such a drop may mean the difference between a signal being received and not being received.

A 0.5 dB change of gain represents a change of less than 0.1 S-unit as currently set into meters at 5 to 6 dB per S-unit. Although not detectable in many types of communications, let's take this unit as the hypothetical least detectable change of gain for at least some types of operation. Using such a standard will allow us to re-evaluate antenna beamwidths by yielding new values. If someone wishes to adopt a more liberal standard, the resulting beamwidths will always be greater than the +/-0.5 dB beamwidth. Hence, any conclusions reached in the following notes can be readily adjusted to the revised standard. With a standard at hand, we have only to apply it to typical antennas used by the amateur community.

As a sampling, I scanned several dozen beam antennas from my collection of models to determine both the standard -3 dB and the suggested -0.5 dB beamwidths.

The standard figure was produced by the modelling software - NEC-4 as commercially implemented. However, the -0.5 dB beamwidth was determined by exploring the azimuth pattern until the gain decreased by half a dB. Since pattern exploration occurs in increments, I chose as the demarcating value the heading on which the gain was at or just above -0.5 dB relative to the maximum forward gain so as not to be too liberal with the recorded beamwidth value. Using NEC models of beam antennas is convenient, since measurement of the -0.5 dB heading would be difficult, at best. Models presume certain conditions that may or may not be true of real antennas. For instance, the models of standard beam designs all produce symmetrical patterns.

OPEN TO QUESTION

The symmetry of the pattern of a real antenna, especially as it increases in frequency and within the tight limits of -0.5 dB points, would be open to question. The models all use free- space gain as the reference in order to fairly compare antennas having vastly different gain values. Over real ground, the take-off angle - or elevation angle of maximum radiation - will vary slightly as we increase the gain of a directional beam, which would make comparisons a bit more difficult. The table below provides model figures for antennas of two types: monoband Yagis and monoband quads. Yagis are far more numerous in the listing—numerous enough not only to show progressions, but as well to show occasional slight departures from progression main lines. The collection of quads is barely large enough to form a progression, but it is sufficiently extensive to allow some comparisons with the group of Yagis.

See table below.

The table reveals several notable items about gain vs. beamwidth.

1. The general trend:

As shown in Fig. 1, the general trend in each group of directional beams is a narrower beamwidth for a higher gain. This fact has been known since beam antennas first appeared in the dim recesses of radio history. However, few amateurs have a due appreciation of the quantification of this phenomenon. Therefore, the table is worth reviewing. Note also that, within limits, the gain-beamwidth relationship is independent of the number of elements within an array. Rather, the gain derived from the beam is the chief determinant of both -3 dB and -0.5 dB beamwidth—or anything in between.

Indeed, the exact boom length is also secondary to the beamwidth, since some nearly equal-gain arrays have differences in operating bandwidth: narrower bandwidth arrays can often achieve a peak gain on a shorter boom. Of course, excessively widening the beamwidth standard can easily let the check points encounter secondary lobes - although not for the reasonably well-behaved patterns in Fig. 1—and thus empty the figure of meaning.

For the most part, HF operators work with antennas with less than 12 dBi free- space gain, in other words, less than 8-9 elements on a long boom. The majority work with antennas yielding between 7 and 9 dBi free-space gain. Consequently, the available -0.5 dB beamwidth will be at least 20 degrees (+/- 10 degrees) of the desired heading for most operators. Even those working with beams capable of 12+ dBi free-space gain will have a -0.5 dB beamwidth of 18 degrees. The situation differs as we increase gain, as is common in VHF and UHF operation.

Beamwidths at the -0.5 dB level shrink to single digit levels, increasing the difficulty of

Representative Beams and Their Beamwidths

Freespace Gain dBi	+/-3 dB B/W degrees	+/-0.5 dB B/W degrees	No. Elements
Yagi type antennas:			
6.13	70.0	28	2
6.27	68.8	20	2
6.48	68.8	28	2
7.12	66.6	26	3
7.80	63.6	26	3
8.11	62.8	24	3
8.48	61.2	24	4
8.90	59.8	24	4
9.25	58.8	24	4
9.71	55.6	22	4
10.05	54.6	22	5
10.21	52.6	22	5
10.22	53.6	22	5
10.23	53.6	22	6
10.23	52.6	20	6
10.28	52.4	20	5
10.53	51.8	20	5
11.07	49.2	20	7
11.33	49.8	20	6
11.89	44.6	18	8
12.25	46.2	18	6
12.54	42.5	18	8
13.27	36.7	16	9
13.33	40.2	16	8
13.89	37.4	16	10
14.21	35.8	14	11
15.22	32.6	14	13
15.68	32.0	14	14
15.68	31.2	12	14
16.27	29.0	12	16
17.62	25.0	10	21
18.59	22.6	10	26
18.66	22.4	8	25
19.64	20.4	8	31
Quad type antennas:			
7.06	75.0	30	2
7.49	74.0	30	2
8.88	65.4	26	3
9.56	61.6	24	4
9.74	60.2	24	3
9.96	57.8	24	4
10.00	57.0	24	6
11.16	49.6	20	5
11.34	49.2	20	5
11.89	45.2	18	6

EMTRON

The following models are available from EMTRON: DX-1b, DX-2, DX-2SP and DX-3.

All EMTRON amplifiers are of similar design, modular construction for easy service and most modules are inter-changeable withing the EMTRON range of amplifiers. All EMTRON amplifiers also have identical features. (See DX-2 features on our web site: www.emtron.com.au). We would also like to point out, that due to extremely effective and advanced design of the control and protection circuitry, so far, we never had to replace a single tube in any of our amplifiers.

DX-1 has now been replaced with the new model DX-1b which is a very much improved version of DX-1. The DX-1b has all the functions or features of the DX-2, (the unique Emtron phase controlled triac soft start, and the same cooling system) except the power output. It can run 800 watts key down indefinitely, or for as long as you want, or 1000 watts PEP.

Emtron's most popular amplifier world wide is certainly the DX-2 & Dx-2a. To this unique amplifier we have added the all new and very exciting DX-2SP.

For the connoisseur, who want nothing but the best, Emtron is introducing the very special DX-2SP. This amplifier stands on its own and has no competition. Produced for the military, the SVETLANA GU-84B tube, with plate dissipation of 2500W, when installed in the new EMTRON DX-2SP, produces a solid 2000W continuous RF output (2500W PEP). Besides the tube and a very special high voltage, high current band switch, as well as the mains transformer, the DX-2SP is identical to our unique DX-2.

Last but certainly no least, is the Emtron's "Big Gun"' the DX-3 amplifier. Specially designed for high power applications, with 3000W continuous RF output power (4000W PEP), the DX-3 is quite unique in the world. Again, the DX-3 has all the features of DX-2, however, it comes complete with QSK module as standard.

DX-3

4000 WATTS PEP/3000 WATTS CONTINUOUS!

For Industrial, Scientific, Medical, Broadcasting, Radio Communication and Export. This superior amp has all the features of our now famous DX-2, utilizing one single 3000 Watt plate dissipation high tech tetrode tube.

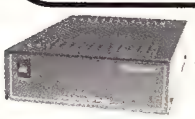
P.O.A - Call us for more information.

DX-2

The Emtron DX-2/2a is a unique amplifier on the market today. We believe that there is NO OTHER single amplifier which would meet the quality, craftsmanship, reliability and price of the Emtron DX-2/2a.

DX-1B

Now the worlds best one Kilowatter. Has all the features of our now famous DX-2 & DX-3 including unique Emtron soft start and a triple overkill cooling system. Runs 750 Watts key down or 1000 Watts PEP indefinitely.



EPS-20ST

The EPS-20st, the sophisticated 20 amp switch-mode power supply is CE approved. **$249**

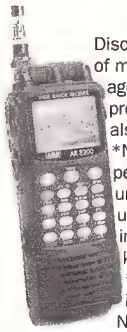
EPS-30A

This unique power supply incorporates 4 x protection (voltage, current, temperature & RF) and a dual CROSS NEEDLE meter for continuous monitoring of voltage, current and DC power. **$599**

FIBERGLASS TELESCOPIC TOWER - 33 FT

Specially designed for antennas. All 10 segments are reinforced three times. The intensive black pigment of the outer material makes it UV-resistant and the segments are individually ground to guarantee the vertical loadbearing capacity.Designed to construct antennas for portable purposes. *total length is 3.8ft - 33 ft *total weight 3.3 lb *designed for portable purposes, quick and easy *ideal for inv. V Dipole, Vertical's and Loopantenna. **$199**

The Best Just Got Better!



Discover why AOR receivers are the choice of many federal, state and local government agencies. Military users, laboratories and professional news-gathering operations also use AOR receivers. *New TXCO for great stability - performance not found in most desktop units! *Brighter backlit display for easy use anytime. *New telescopic antenna included for better reception. *New keyboard layout for easier operation. *Attractive new black case. *Now includes 1100 mAh high capacity Ni-Cd batteries. $1190

AR7030 PLUS!

*Increased balance of the mixer for the greatest IP2 &IP3, *High tolerance 0.1% components in DDS ladder for low noise, *Enhanced RF attenuator operation for minimal intermod, *Higher spec. wire aerial input transformer for minimal mixing products, *Ceramic metal cased 4 kHz (displayed) AM filter fitted as standard, *Bourns optical encoder for the smoothest DX tuning, *Features CPU fitted, 400 memories, multi timers & alfa tag. POA

AR7030

Frequency coverage is from 0-32 MHz all mode: AM, Synchronous AM, USB, LSB, CW, DATA & NFM. **POA**

SDU-5500

The SDU5500 Spectrum Display Unit adds a variety of features to extend a receivers capabilities, such as visually identifying new active frequencies and taking measurements. **$2095**

AR5000

Prior to the AR5000, it took 2, 3 or even 4 receivers to cover this range, plus the small size and low power demands make the AR5000 ideal for field use, remote control radio, and local & remote computer control. **POA**

AR5000+3!

Provides three enhancing facilities. A.F.C; switchable automatic frequency control, noise blanker; switchable to help reduce the effects of ignition noise, and synchronous AM; featuring double and selectable sideband. **POA**

AR3000a

Receive coverage from 100kHz all the way up to 2036 MHz without any gaps in the range.

POA

SCANMASTER

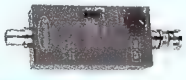
Scanmaster Active Base Antenna

25Mhz-1500Mhz

* Marine * PMR
* Civil Aircraft
* Military Aircraft
* Amateur Radio
* 900 MHz Band
* Plus more public services

SP-55 24-1500 Mhz AMP

State of the art, low noise wide-band pre-amplifier that allows top performance from base & handheld scanners. Runs on 12V, DC external



$230

RF SYSTEMS

DX-1

An active antenna for professional & commercial applications. Its military version has the same specifications! **$1170**

WINI-WINDOM ANT.-Comes with magnetic Balun. Broad-band antenna for portable radios, communication receivers and scanners with shortwave coverage. Ideal for portable receivers, scanners and computer controlled receivers.

DX-7 $595

Active helical short-wave receiving antenna, designed to withstand the worst weather conditions and especially for long distance and weak signal reception. Optional DC adaptor for 12V battery supply.

MLB.

Magnetic Longwire Balun makes it possible to use coaxial lead-in cable with all forms of long-wire or other types of wire antennas. **$135.00**

DX-10 $99

DX-10 is a low cost high quality active antenna for long, medium and shortwave reception. Designed for indoor as well as outdoor use. The sensitivity of this antennas rises with the frequency. **100 kHz - 30 MHz.**

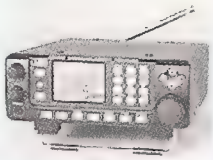
MT ISOLATOR Noise Reducer and Lightening Protector

The MT Isolator is a completely new type of device which separates the antenna completely from the receiver or transceiver. It reduces atmospheric static and man-made noise and interference. It protects transceivers, receivers and operators from static charges and lightening. **$240**

NEW! AR8600

Any time, any place...

WIDE BAND ALL MODE RECEIVER
530 KHZ - 2040 MHZ WITH RS232 PORT



The AR8600 is an extremely versatile receiver which can be used virtually anywhere, mobile, base or trans-portable... powered from an optional 12V d.c power supply, optional d.c lead from a 12V vehicle or from an optional internally fitted NiCad battery pack. A strong twin metal case with die cast front panel characterizes the multi-purpose role. All mode receive capability is provided including Single Side Band with programmable tuning steps down to a resolution of 50 Hz with the frequency established by a highly accurate Temperature Compensated Crystal Oscillator (TCXO). An RS232 port further extends the capabilities with free supporting control software available from the AOR web sites. **$1595**

AEA INSTRUMENTS

***SWR-121 HF:**
1-30MHz Graphical SWR Antenna Analyzer.
***SWR-121 V/U:**
120-175, 200-225, 400-475 MHz SWR Analyzer.
30-150 Analyst: 30-150 MHz graphical antenna analyzer.
***Cellmate Analyst:**
806-960 MHz graphical antenna analyzer.

AEA CIA-HF
400Hz - 54MHz

WINRADIO

Expand the power of your WINRADIO with numerous digital modes and utilities. Puts advanced radio receiver technology directly on a PC platform!

*Audio Recorder and playback	WEFAX) and more!
*Packet Radio	**WR-1000i...$518.95**
*Radiofax (HF fax and WEFAX)	**WR-1000e...$731.23**
*Aircraft Addressing and	**WR-1500i...$848.49**
Reporting System(ACARS)	**WR-1500e...$951.23**
*Packet Radio	**WR-3150i-DSP...$2,629.44**
*Radiofax (HF fax and	**WR-3150e...$2629.44**

TEN-TEC

New Visions of the Future HF Transceiver!
Introducing the marriage of the power of PC, Digital Signal Processing and the HF Rig. Combines the power of your PC with a cutting edge ID DSP design. **$1995**

RX-320 PC RADIO

Ask for information on this DSP based receiver. Runs on Windows.
POA

RADIOMASTER

NEW!

A-50

Wide Band active antenna for long, medium and shortwave.

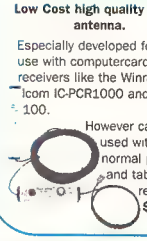
*Freq range 30 kHz -50MHz * In and outdoor use *Omni-directional recep. pattern *Up to 10 dB —gain, low noise *1.1m long, 10 m lead-in coax *weatherproof*

$285

A-108

Low Cost high quality active antenna.

Especially developed for the use with computercard receivers like the Winradio and Icom IC-PCR1000 and PCR-100.



However can be used with normal portable and tabletop receivers. **$299**

AC-108

Antenna combiner for Wideband receivers and scanners.

$155

Covers frequency range of 30 - 108 MHz, the range where neither shortwave shortwave antennas nor discones perform satisfactorily. Is equipped with an adjustable output level to avoid overload of the antenna. Plug in design, no extra cables required.

P-30

Wide Band receiving wire antenna for long, medium and shortwave.

*Freq. range 500kHz - 30 MHz *Just 4 meters long, 4m coaxial cable to the receiver .*In and outdoor use * No antenna tuner required *Built in matching transformer * completely assembled. * Passive, no intermod. or overload. $95

EMTRONICS
First Floor, 94 Wentworth Avenue Darlinghurst 2010
(Above York Opticals Telescope Shop) P.O Box K21 Haymarket, 2000
Phone: 9211 - 0988 Fax: 9281 - 1508
Email: Emtron@ozemail.com.au Website: http://www.emtron.com.au

accurately aiming an array. Indeed, independent references are often needed to precisely position a very high gain array on its target.

2. Quad vs. Yagi beamwidth:

At every level sampled where the gain of a quad array could be roughly equated with the gain of a Yagi array, the quad exhibited wider -3 dB and -0.5 dB beamwidths. As shown in Fig. 2, the difference is most dramatic at lower gain levels: the plots show antennas with 7+ dBi free-space gain levels. The linear plot is necessary to display the two patterns clearly. As the gain of the array increases, the differential in beamwidth between Yagis and quads decreases.

However, it never disappears entirely within the range of arrays sampled here for the quads. However, since no quad with a free-space gain above 12 dBi was used in the listing (since I do not have any in my collection of models), there may well be a point at which the differential disappears from view. What applies to the differential between Yagis and quads also applies to other types of arrays. It is always unwise to assume from a glance at an azimuth pattern that a directional beam has a certain order of beamwidth at any level used as the standard. Careful checking of each design is necessary to know for certain.

3. Exceptions to the trend:

Within the list of directional arrays, there are a few exceptions to the general progression of gain vs. beamwidth correlations. Moreover, the progression would not graph out as a smooth curve for either the - 3dB or -0.5 dB levels. Fig. 3 demonstrates why the curve would be irregular. Not all patterns are the smooth ovals that we associate with "perfectly designed" parasitic arrays. Although the curve on the left resembles in its main forward lobe outline the middle pattern of Fig. 1, the forward secondary lobes make it difficult to know for sure whether the main lobe has been distorted from the most "well-behaved" condition.

Hence, ripples in the general progression are bound to occur wherever secondary forward lobes are present. As the right side of Fig. 3 demonstrates, even when the secondary lobe structure seems invisible, it may exert an effect on the beamwidth.

For equal-gain antennas, the "bullet" pattern to the right has a narrower beamwidth by noticeable amounts at both levels of interest in these notes.

The widening of the pattern as the bearings approach the side nulls is an indication of secondary lobe formation.

In fact, changes in the azimuth pattern that can affect the beamwidth may occur across the operating bandwidth of an antenna, even though gain changes are small to negligible.

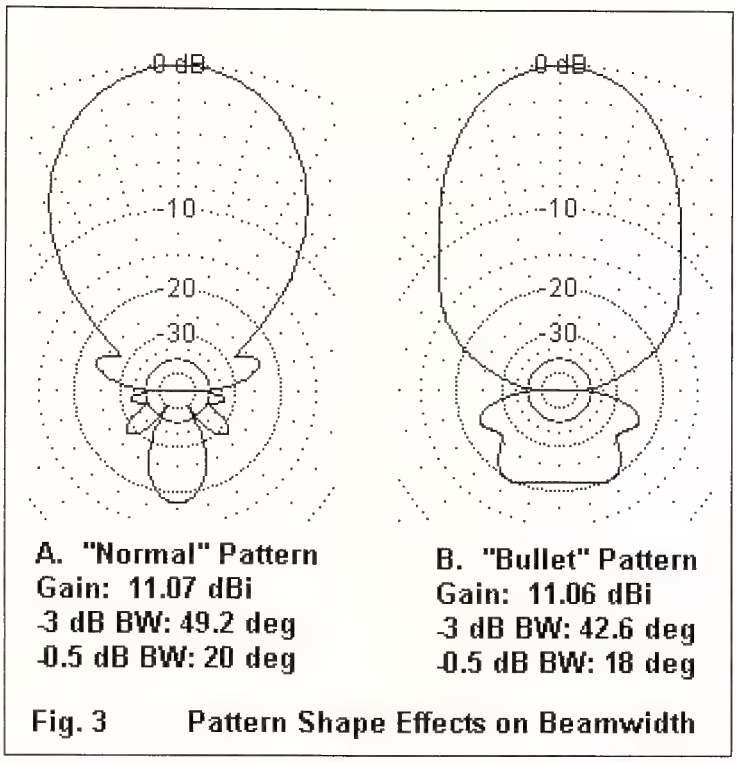


Fig. 3 Pattern Shape Effects on Beamwidth

For well-designed arrays with limited operating bandwidths, such differences are likely to be only of academic interest. However, they do exist and may play a role in performance wherever designs are pressed beyond their limits.

SOME TENTATIVE CONCLUSIONS

The second portion of these notes was designed to graphically and tabularly demonstrate the relationship between gain and beamwidth for a span of array gains that cover most amateur operations.

However, the basic question for the second part of these notes was how accurate our beam aiming must be to achieve the strongest signals between locations. If we combine the notes for the two portions of this preliminary investigation, some tentative answers emerge.

1. For lower gain, wide beamwidth arrays - typical of most (but not all) HF operations - excessive concern with the precise heading of a beam seems to be beyond the level of necessity.

The potential errors of heading indicators are offset by the very wide -0.5 dB beamwidth - in most cases, better than 20 degrees.

Unless on the cusp of detectability, most changes of five degrees in beam heading will not yield any change in signal strength that will show up on a meter. For this class of arrays, simply point at "Europe" or "Southeast Asia" will be accurate enough, although a final tweaking to compensate for unquantified indicator system errors may be useful.

For voice and CW operations, where the -0.5 dB standard for detectable signal strength change is too stringent, the available beamwidth before a change of beam direction would make a difference can be considerably wider.

2. For very high gain system with inherently narrow beamwidths, such as those above 12 dBi free-space gain, the indicator system error and the -0.5 dB beamwidth begin to merge.

For such systems, adjunct aiming accessories are certainly warranted as a matter of course for each change of beam direction. Such auxiliary systems may involve manual or automated fine aiming relative to signal strength, or they may make use of adjunct directional aids derived from precise navigation work.

3. For the intermediate level system with free-space gain levels between 8 and 13 dBi, we have a situation that is difficult to define in terms of operational actions. When used for casual or slow-rate operations, manual system tweaking based on signal strength of the target station (and possibly QRM from other competing stations) often suffices. However, for high-speed and competitive operations with definite target stations, even an operating assistant may not be able to keep pace with the need for adjusting headings to be as precise as necessary for the highest efficiency.

It is in these kinds of cases that we find appropriate concern with precision installation settings, indicator system error levels, and (automated) adjunct heading adjustments. However, system error potential and antenna beamwidth alone - even when all normal variables are taken into account - do not tell the full story.

To these factors we must add the propagation conditions and paths that exist at any given moment of operation.

This final collection of variables can sometimes (but certainly not always or even most of the time) void the best results of the most precise system that does not rely on careful listening and re-aiming for the strongest signal. In the end, each operator must make his or her own decisions on how much effort to place into each phase of the problem of aiming a directional array.

These notes - especially the beam data - are designed to help with, but not substitute for, the process through which each station operator must go in directing his or her array.

SUGGESTION

Having read the article, we would like to suggest that you visit LB's web site and check out some of his books and CDs. There is more antenna material there than you can wave a large stick at – and it comes from a highly qualified amateur.

Again, R&C's thanks to LB

Make your own Inductance Meter

John Saunders, VK2DEJ

There's no doubt about it; the art of home brewing has greatly declined over the years as more and more commercial equipment appears on the market.

In this day and age one can literally walk into an amateur radio store and buy a complete station and be straight on air, without having to touch a soldering iron.

To home-brew something for the shack takes time and persistence, something many of us don't have in this modern fast-paced society.

Chasing up the required bits and pieces for a do-it-yourself project also puts many people off. Again time is the factor; we just simply don't have the time available to run about chasing up the components required.

As technology advances at an alarming pace a lot of the odds and ends needed for home construction are either discontinued or scarce as hen's teeth.

In this short article on making your very own inductance meter I found that the parts described are readily available. Once you have gathered the required materials the project should be completed in around four hours.

A fine-pointed soldering iron with a good clean tip is essential; the two small circuit boards I used were obtained from my junk box and modified to suit. A good drill and some assorted screws and nuts will also come in handy.

STARTING OUT

Sometime ago I wanted to make a couple of linear amplifiers and it became apparent that a device was needed to measure inductance. It did not need to have great accuracy - within 10% would be quite adequate for the job.

There are several ways of measuring inductance - by comparing the coil with a known capacitance, by resonance, or simply by using a variation of the good old Wheatstone bridge and measuring the unknown inductance against a known inductance.

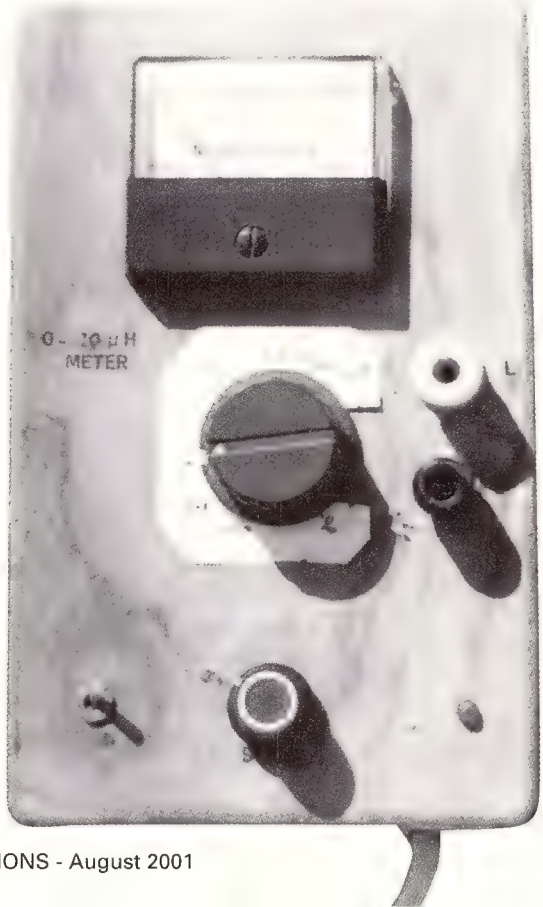
Precision devices can measure at the frequency the coil will be used, but in this case there is no need. I chose 4.43MHz simply because I had a crystal of that frequency lying about the bench.

In fact, you could use a L/C oscillator without any trouble and any frequency between 4 to 10MHz.

"To home-brew something for the shack takes time and persistence, something many of us don't have in this modern fast-paced society"

THE CIRCUIT

The circuit chosen was a variation of the Wheatstone bridge with a total range of 0-10 microhenries.



Most coils I needed would fall in this range while this arrangement allows one end of the unknown coil to be at ground potential.

The waveform was a little distorted and as I had just built another inductance meter it was decided to build a low pass filter, which gave very good sine-wave output.

It must be pointed out, that the unit will work quite well without the filter.

Mains powered...

As Murphy's Law states that the battery will be dead flat when you need it, it was decided to run the inductance meter from the mains.

One must be very careful with mains wiring, being sure to place no stress on any soldered joint and have them well covered.

The transistors are all 2N2222 or any other similar type.

INTERNAL LAYOUT

The heart of the unit is the 1.0-microhenry coil in the bridge; this is wound on an Amidon T-68-2 powdered iron toroid.

The two coils in the low-pass filter are wound on similar cores. Use a gauge of wire that allows you to wind 13 turns using up about 270 degrees on the former.

The wire utilised in my coils for the filter, and reference, coils was 1mm in diameter.

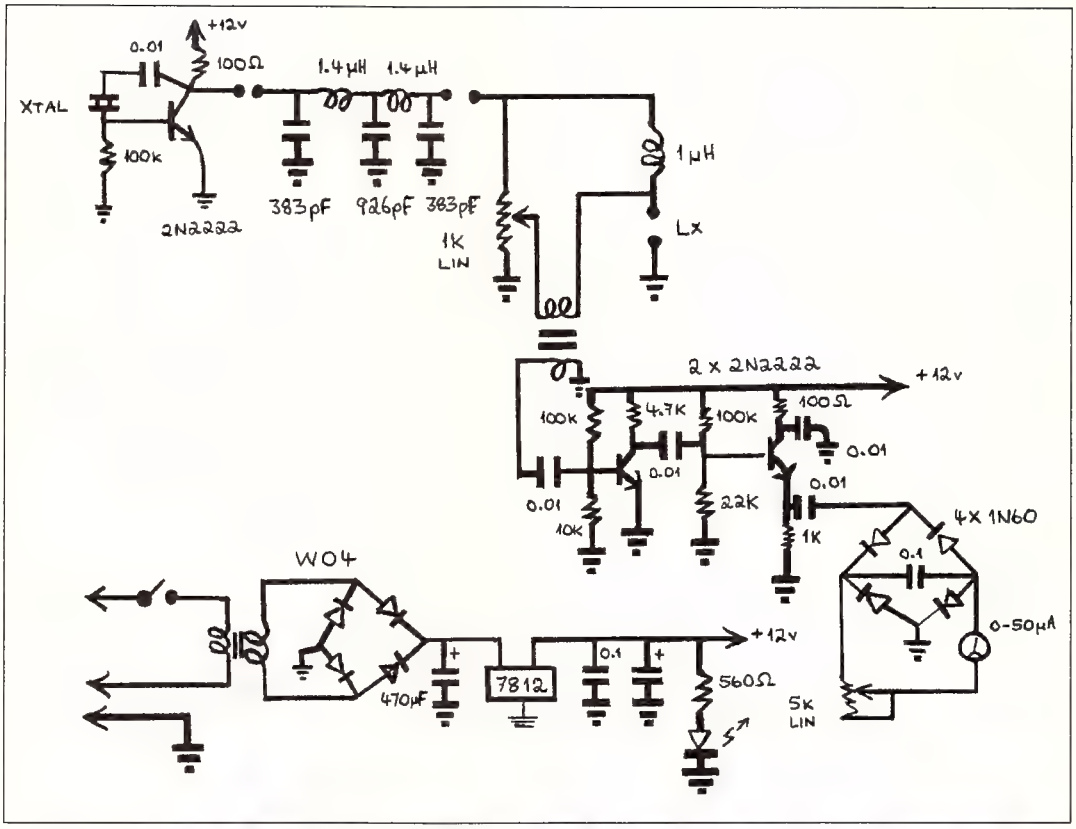
Most Wheatstone bridges show a meter of some kind across the centre terminals of the bridge. In this case, it was decided to put a smaller amplifier to ensure plenty of drive to the meter enabling a very sharp dip when measuring.

To isolate the amplifier from the bridge I used a transformer; this is wound on yet another T-68-2 toroid core from Amidon. The primary and secondary are wound on opposite sides of the core to ensure only inductive coupling between the two windings.

It's recommended that you use wire about half the gauge used on the other coils previously, with 20 turns for each.

The amplifier is a very simple one-stage, driving a second 2N2222 as an

emitter follower, which feeds into a full-wave bridge using four germanium diodes to minimise the voltage drop. There's a 4.7K pot to control current through the 50-microamp meter. This needs to be adjusted as you balance the bridge for your final reading.



THE END PRODUCT

The operation of this unit is very simple, just switch on the power and adjust the sensitivity control for full-scale deflection of the meter. Connect the unknown coil and vary the potentiometer for a null on the meter.

Wind up the sensitivity control and further vary the control, then a sharp dip will be read off the scale.

The way to calibrate it is by purchasing a range of radio frequency chokes from Dick Smith Electronics or Jaycar. More than likely you will have to procure about 10 different sizes ranging from 1-10 microhenries.

The lower section of the scale could be marked out by paralleling the chokes in order to present you with the required value.

APPLICATIONS

This simple project will be very useful in measuring the inductance of coils for use in RF amplifiers and filters.

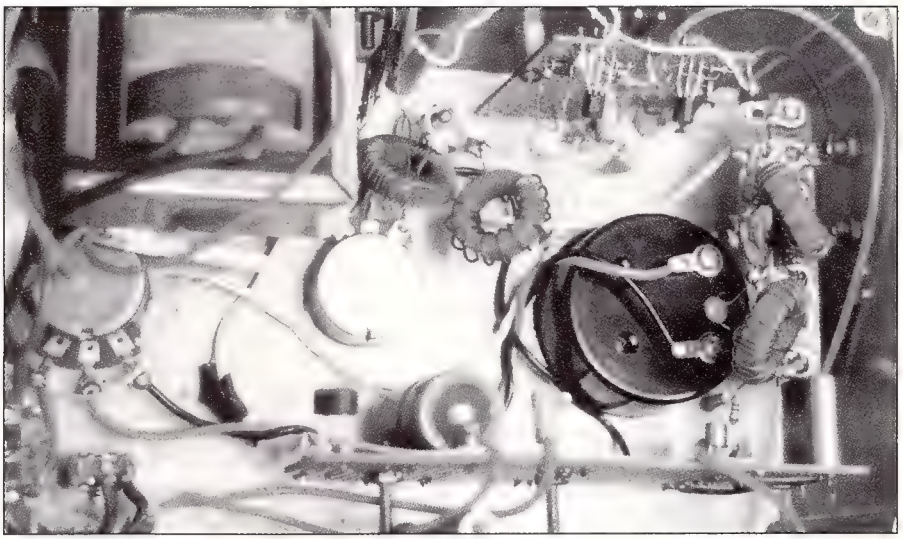
Don't put your inductance meter away yet - in a future issue of Radio & Communications we will be looking at constructing a 200-watt 50MHz linear amplifier.

Total costs...

While a number of the required bits and pieces were already in my junk box, the total price would be near $70, a great deal cheaper than buying a commercially made unit!

More importantly, you cannot buy the pride and satisfaction felt when you have made something yourself can you?

73 from John Saunders VK2DEJ.



WHAT YOU WILL NEED

External fittings:

1 X Diecast box 190x120mm with a depth of 60mm.
1 X 50 microamp meter (DSE catalogue Q-2021)
1 X On/off toggle switch
1 X Red LED (DSE catalogue Z-4077)
1 X Potentiometer (large) 1K linear (range knob)
1 X Potentiometer (small) 5K linear (sensitivity)
2 X Terminals

Internal components:

1 X Transformer 240-15 volts
1 X Bridge rectifier (W04) (DSE catalogue Z-3304)
1 X 12 volts DC regulator (7812)
3 X Transistors 2N2222 (DSE catalogue Z-2069)
1 X Crystal 4.43MHz
4 X Toroid powdered iron T-68-2 Amidon
1 X Capacitor 470 microfarad 25 volts
1 X Capacitor 10 microfarad 15 volts
2 X Ceramic capacitors 0.1 microfarad
5 X Ceramic capacitors 0.01 microfarad
4 X Diodes 1N60 (germanium)
2 X Capacitors 383 picofarad (made up from preferred values)
1 X Capacitor 926 picofarad
2 X Resistors 100 Ohm (0.25w)
1 X Resistor 1K Ohm (0.25 w)
1 X Resistor 10K Ohm (0.25w)
1 X Resistor 22K Ohm (0.25w)
1 X Resistor 4.7K Ohm (0.25w)
3 X Resistors 100K Ohm (0.25w)
1 X Resistor 560 Ohm (.25w)
2 X Circuit boards (home made)
1 X Tag strip

Compiled by Craig Seager, 12 Pellion Place, Bathurst NSW 2795 Email cseager@ix.

"MEDIASCAN" DISCONTINUED

European broadcasters, in particular, have long held the view that the radio hobbyist is a less than valuable member of their audience.

Accordingly, it comes as no surprise that Radio Sweden has decided to discontinue its regular "MediaScan" segment, effective a couple of weeks before this R&C issue hit the news stands.

Previously known as "Sweden Calling DXers", the program was the oldest of its kind in international broadcasting, having commenced in 1948 under the stewardship of the legendary Arne Skoog. Up until recent years, the program was a treasure-trove of shortwave loggings and news, hosted till the end by George Wood.

But will shortwave Dxers mourn the passing of "Mediascan"? I think not. For some time the emphasis has been on satellite programming, mainly relevant to the European market, with shortwave only rating an occasional mention. George Wood is endeavouring to distribute "Mediascan" as a weekly e-mail only bulletin from 1st August, in a similar move to that taken by Radio Nederland when it discontinued its "Media Network" program. Yet another sign of the times.

IN TOUCH WITH THE DUTCH

Radio Nederland, the Dutch international broadcaster, has this schedule for English:

Time	Transmitter	Frequency	Target
0430-0530z	Bonaire	6165 kHz	North America
0430-0530z	Bonaire	9590 kHz	North America
0930-1130z	Bonaire	9790 kHz	Aust/New Zealand
0930-1130z	Petropavlovsk	12.065 kHz	Far East/Australia
0930-1130z	Irkutsk	13,710 kHz	East Asia/Australia
1030-1225z	Juelich (Germany)	6045 kHz	Western Europe
1030-1225z	Wertachtal (Germany)	9860 kHz	Western Europe
1430-1625z	Madagascar	9890 kHz	South Asia
1430-1625z	Madagascar	11.835 kHz	South & Southeast Asia
1430-1625z	Tashkent	12.075 kHz	Southeast Asia
1730-2025z	Madagascar	6020 kHz	South Africa
1730-2025z	Madagascar	7120 kHz	East Africa
1730-2025z	Flevo	11.655 kHz	west Africa
1830-2025z	Flevo	9895 kHz	west Africa
1830-2025z	Flevo	13.700 kHz	West Africa
1830-2025z	Bonaire	17.605 kHz	Central & West Africa
1830-2025z	Bonaire	21.590 kHz	Central & West Africa
2030-2230z	Wolvertem (Belgium)	1512 kHz	Central & West Europe
2330-0125z	Bonaire	6165 kHz	North America
2330-0125z	Bonaire	9845 kHz	North America

As is evident from the above, Radio Nederland uses a variety of foreign relay sites to improve its outreach.

The main transmitter site in Holland is located on the Flevo polder, an area that has been in the news recently. Much of the land in the Flevo area is reclaimed, and actually resides below sea level.

Farmers in the region have reportedly been regularly plowing up parts of Jet in a couple of celebrated cases, complete ships from the mud, dating back centuries. Obviously an area of historical as well as broadcasting significance!

In further news, a late press release from Radio Nederland indicates that it is now broadcasting to North America on all the frequencies being relinquished by BBC World Service, which as we reported last month, has ceased direct shortwave broadcasts to North America and the Pacific. "Short-wave remains the only direct way to share a full range of important issues with a loyal audience in the USA and Canada" says Radio Nederland's Director General Lodewijk Bouwens.

"Holland was the first country to start direct broadcasts and programme exchanges with stations in North America back in 1928. We haven't looked back since."

"Shortwave offers us the opportunity to share a much wider range of news and features at a convenient listening time.

"We can offer more depth and content than is allowed on domestic media, knowing that the audience has made that extra effort to tune in."

CHRISTIAN VOICE BACK

After a brief hiatus while it bedded down the new relays of Radio Australia from its Darwin facility, Christian Voice Australia has emerged again with a regular test schedule, including some new channels. The announced schedule is:

9725 kHz	2130-2200z
9865 kHz	2030-2130, 2330-0000z
11,840 kHz	2030-2200z
17,820 kHz	0700-0800z
17,850 kHz	2200-0100z
21,550 kHz	0100-0700z
21,680 kHz	0030-0400, 0430-0500, 0530-0800z

At the time of writing, programming consists mainly of relays of Christian Voice's African service, with local continuity announcements inserted.

Although Christian Voice intends to construct its own studios in Australia, the organisation has recently signed a contract with IRIS Gateway Satellite Services for provision of a turnaround service at the Makarios Earth station in Cyprus. IRIS is a joint venture between Merlin Communications (UK) and the Cyprus Telecommunications Authority (CYTA). The agreement will see IRIS deliver the Christian Voice International radio service to its transmission sites in Australia and Asia, utilising capacity on AsiaSat 2.

Programme material is distributed from Christian Voice's studios in the Midlands and uplinked onto Intelsat 804. IRIS then receives the signal and uplinks the service onto AsiaSat 2, where it is downlinked to Christian Voice Darwin. Content is then re-broadcast in English on short wave to key target audiences in South East Asia and China. Services in other languages will later be developed from C.V.'s facility in Maroochydore (QLD).

NEW STATIONS TARGET IRAN

This column has been hearing two new broadcasters in the Persian language, beamed to Iran and using 7480 kHz from

a transmitter at Grigoriopol in Moldova. Radio Payam-e-Doost ("Message from a Friend") is operated by the Bah'ai faith and goes out from 1800-1830z.

The second station, Radio Barabarai (Equality) has more of a political lean, and comes on air at 1700z. Strong signals are observed in NSW.

A third Iranian clandestine from Grigoriopol is Radio International, using 11,635 kHz and heard here at 1700z. Signal strength is adequate, but a loud transmitter buzz is in evidence, competing with the modulation.

PERUVIAN DRIFTS

Over many years the strongest station from Peru, or indeed one might argue all of Latin America, has been Radio Union. Based in Lima, Union has long used 6115 kHz, and enjoys an audibility span of 0300-1200z with its up-tempo Latin pops and familiar canned announcements.

Recent months have seen a fault develop in the transmitting equipment, and Union can now be heard on approximately 6311 kHz, with a very distorted signal. The problem has become so bad, that the writer was recently only able to resolve the programming using the receiver's CW mode.

NEW SERVICE

The World Beacon debuted its new service to Russia and Eastern Europe during June.

The program can be found on 17,795 kHz Monday through Friday from 1400-1800z. Ray Davis, Founder and Chairman of World Beacon parent company Affiliated Media Group announced the launch at the National Religious Broadcasters annual conference in Dallas Texas.

"In the ten months since we launched the African Beacon, response to this important mission initiative has been overwhelming," Davis said. "The addition of a service directed to the former Soviet Union is a natural next step."

RL/RFE TURN 50

The year 2001 marks the 50th anniversary of one of the more controversial operations on the shortwave bands, and one whose continued existence is constantly questioned by those holding the purse strings since the collapse of Communist rule in Eastern Europe.

The organisation now known as Radio Liberty/Radio Free Europe was conceived in 1949, at the height of the Cold War, but it wasn't until April of 1951 that regular transmissions commenced.

Broadcasts to the Communist nations of Eastern Europe were the first to begin, based on the premise that the populace in those countries didn't have access to "free media".

From the start, funding was (covertly) provided by the US government, and programming was prepared in New York until the completion of purpose-built facilities in Munich, West Germany.

It wasn't until 1953 that transmissions to the Soviet Union proper began, in Russian, with the languages of the various Soviet republics following soon after.

The first transmitter was a low-powered (by today's standards) unit at Lampertheim in West Germany, though more powerful equipment at Gloria in Portugal was pressed into service not long after, followed by Playa de Pals (Spain) in 1959.

Between 1973 and 1976, the Radios were reorganized, creating a bipartisan board of directors, appointed by the president and combining Radio Free Europe and Radio Liberty into one private, non-commercial organization supported by the Congress.

Many thought that the eventual demise of the Soviet empire would render RFE/RL redundant, however the US government determined that the resultant political instability in Eastern Europe ensured a role for the station into the future. For the first time, also, RFE/RL was able to make open use of journalists in the target area itself, giving greater credibility to news material. This culminated in the headquarters and studios moving from Munich to Prague in 1994.

Although its budget has been decreased, RFE/RL has added transmissions to cover particular "hot spots", including Iran, Iraq and the Balkan region.

To mark the occasion, the US Broadcast Board of Governors, which supervises all US-funded international broadcasting has convened a joint meeting in Prague with RFE/RL's Board of Directors. They are to be joined by members of RFE/RL's European Advisory Committee. The radios have invited journalists, diplomats, academics, and political and religious leaders to join in the observance.

Earlier in the year, various ceremonies were held to commemorate the anniversary, including speeches from Yelena Bonner, the widow of the renowned Russian dissident Andrei Sakharov, and Vaclav Havel, the Czech President and a long-time supporter of RFE/RL's endeavours.

By coincidence, the transmitting site at Playa de Pals in Spain was closed at the end of May, and all transmissions moved to other IBB sites.

NEW ZEALAND

Radio New Zealand International has this schedule until 2nd September:

Time	Frequency
1650-1850z	6095 kHz
NE Pacific, Fiji, Samoa, Cook Islands (Monday to Friday)	
1851-1950z	11,725 kHz
All Pacific	
1951-2216z	15,160 kHz
All Pacific	
2217-0458z	17,675 kHz
All Pacific	
0459-0705z	11,725 kHz
All Pacific	
0706-1105z	9885 kHz
All Pacific	
1106-1305z	11,675 kHz
NW Pacific, Bougainville, East Timor, Asia	
1305-1650z	6095 kHz
All Pacific (Occasional use only)	

INDIAN REACTIVATES

In "Hard-Core DX" Jose Jacob reports that the All India Radio regional station at Jeypore has returned to shortwave after an absence of about two years.

The observed schedule is:

0025-0430z	5040 kHz
(Sundays to 0445z)	
0700-0905z	6040 kHz
1030-1130z	6040 kHz (Sundays only)
1135-1700z	5040

The 50 kW transmitter has apparently been off the air due to a shortage of spare valves, and continues to display some continuity problems.

The address for reception reports is: All India Radio, Jeypore 764005, Orissa, India.

IRAN

The Voice of the Islamic Republic of Iran now has this schedule for English language programming:

0030-0127z	9022, 9835, 11,970 kHz
1100-1227z	15,385, 15,430, 15,585, 21,470, 21,730 kHz
1530-1627z	7115, 9635, 11,775 kHz
1930-2027z	9022, 9570, 11,670, 13,730 kHz
2130-2227z	9570, 13,745 kHz

continued over page

continued from previous page

Additionally, there is an obscure English service intended for Israel called "Radio Shalom", which goes out from 1900-1927z on 7175 and 9745 kHz.

This news courtesy of Ivo Ivanov in "Observer" and "Top News"

CLANDESTINE CORNER

Netsanet Le Ethiopia Radio is a new station that can be heard every Wednesday and Sunday from 1700-1800z on 12,110 kHz.

Programs are beamed towards Ethiopia and are in the Amharic language, reports Ludo Maes of Belgium. According to the station's web page, Netsanet Radio was established to:

*Promote the cause of peace, democracy and unity by emphasizing the deep-rooted historical, cultural and economic ties among Ethiopians.

*Inform Ethiopians the current political, economic, cultural events and developments of interest to Ethiopia

*To raise the awareness of Ethiopians values, process and institutional mechanisms which democracy, human rights key concepts in Ethiopian society.

*Inform the international community of violation of human rights, expression of civil and political liberties and obstacles to the democratic aspiration of Ethiopians

*Provide forums for discussions regarding the need for free election and democratic constitution in Ethiopia.

*Contribute for the development of free press.

HERE AND THERE

* **Radio Nederland's** Andy Sennitt advises that Radio Canada International is now broadcasting via the Flevo transmitter site in Holland at 1900-1959z on 13,670 kHz.

The broadcast, which is in French, was previously relayed via Skelton, in the UK. Additionally, clandestine station Voice of Democratic Burma has made a frequency change, using RN's Madagascar relay on 17,805 kHz from 1429-1455z.

* **Radio Tashkent** is currently observed on 11,905 kHz with an English program from 2130-2200z.

This new frequency provides good reception in Australia, despite being beamed towards Europe.

* **United Patriot Radio,** the latest version of the station originally conceived as Kentucky State Militia Radio, appears to have left the airwaves once again.

This extreme right wing clandestine operation had been heard in Australia until late June on frequencies such as 3260 and 6900 kHz USB, during our early evening period. Both frequencies are certainly worth watching for a possible reactivation, and there are also rumours of both sympathetic and parody broadcasters popping up on these channels since UPR's demise.

* **Radio Cancao Nova** is one of several Brazilian local stations to operate on more than one shortwave frequency in parallel.

Located in the town of Cachoeira Paulista, this Catholic operated broadcaster is observed on 4825, 6105 and 9675 kHz, all heard around 0700z in the Portuguese language.

* **Also from Latin America**, the mid-winter period has brought a rare glimpse of Radio Difusora Nacional de Colombia, heard on its sole shortwave channel of 9635 kHz.

Fair signals are noted up until 0500z sign-off, with identification confirmed by a stirring rendition of the Colombian national anthem at that time.

* **Ian Baxter** (Finley, NSW) reports reception of the reactivated Radio Nacional de Guinea Equatorial, Bata, on 5003 kHz until its sign-off at 2200z with a national anthem.

Bata has been off air for some months, and Ian points out that the signal peaks at around 2145z. Another transmitter, located at Malabo, is audible on 6249.4 kHz, heard by myself and John Schache at 0530z. A better opportunity for this one is at 2200z (sign-off appears to be between 2230 and 2300z). Distinct from most other countries in Africa, Equatorial Guinea uses Spanish as its main national language.

* **Poland** has always been one of the more difficult European countries to hear on shortwave, however Chris Hambly (Melbourne) tells me that he is currently enjoying reception of Radio Polonia's English service on three frequencies.

The broadcast commences at 1930z on 9540, 7165 and 6030 kHz, with fair to good signals on all but the 49 metre band channel.

* **Radio Congo,** Brazzaville, appears to have moved back to 5985 kHz, replacing recently adopted 4765 kHz, which has been a massive signal in our mornings up until 2300z sign-off.

Since the station is currently not letting the grass grow under its feet, any of 4765, 5985 or 9610 kHz are possibilities, with best reception likely at 2100z.

EUROSONOR RADIO

Eurosonor Radio is the name of a private station broadcasting once a week from a transmitter thought to be located near Sofia, in Bulgaria.

The station, which commenced transmissions on 1st April 2001 claims to be borne out of a "fascination for shortwave listening" and a desire to present special music programs.

Eurosonor Radio is on air Sundays only from 1600-1700z on 9980 kHz, and provides good signals in Australia. Programming is mostly in German and the 30 metre channel is a recent replacement for 6900 kHz.

FEBC UPGRADE UNDERWAY

Far East Broadcasting Company (FEBC) has announced plans to install new transmitters at its Bocaue site in the Philippines.

The equipment is expected to be fully operational by the end of 2002, and increases output from 30 kW to 100kW.

Approximately 84,000 letters arrive every month at FEBC offices around the world. Listeners from Asia, particularly Vietnam, Laos and China, have complained about the difficulty in hearing FEBC programs because of static and interference and so it became apparent that the transmitters, which worked well for 40 years, needed a complete overhaul.

The station earlier this year completed a US $3.5 million antenna upgrade phase of its SAVE (Southeast Asian Voice of Evangelism) project. SAVE, one of FEBC's

Radio Prague is primarily run by English staff

largest technical ventures, is focused on the Bocaue facility, which is just one of 37 transmitter sites owned and operated by FEBC.

The four high-gain antennas are adjustable, allowing the signal to be steered toward targeted areas, which quadruples the strength of the broadcasts. According to FEBC field staff, results have been successful with monitors in the target area reporting increased signal strength.

"SAVE is a milestone in our ministry's history," Jim Bowman, FEBC president, said.

"It is difficult to express how important this project has been in not only keeping up with the advancement of technology, but even more importantly in providing millions of isolated listeners with a stronger signal in which they can receive solid biblical teaching and encouragement through FEBC programs."

Some of the transmitting and antenna equipment used in the Philippines by FEBC is said to date back to World War 2.

NEW LICENSES PROPOSED

The Australian Broadcasting Authority has announced that it is proposing to make licences available for new community radio services in Wagga Wagga and Young, New South Wales as well as providing additional FM channels to improve reception of existing services in Wagga Wagga, Griffith, Cootamundra and Cowra.

In addition to making an extra community station license available in Wagga Wagga, the existing non-profit broadcaster, 2AAA, should also be allowed to increase its output power.

The ABA is proposing to increase the power for the four existing (town only) ABC national radio services in Wagga Wagga.

In Griffith, the ABA proposes to increase the transmission power for the existing community radio service, 2MIA, whilst in Young, the ABA is proposing to make available one new community radio service. Young's commercial station, 2LLF, will also be able to set up relays to cover Cowra and Cootamundra.

The draft licence area plans for the Riverina region are subject to public comment and submission, prior to being implemented.

CZECH REPUBLIC

Radio Prague has this schedule for English broadcasts:

0700-0727z 9880, 11600 kHz
North West Europe
0900-0929z 21,745 kHz
South Asia/ West Africa
1030-1057z 9880, 11615 kHz
Northern Europe
1300-1329z 13,580 kHz
Northern Europe
21,745 kHz South Asia
1600-1627z 5930 kHz
North West Europe
21,745 kHz East Africa
1700-1727z 5930 kHz
North West Europe
21,745 kHz Central Africa
2000-2027z 5930 kHz
North West Europe
11,600 kHz
South & East Asia/Australia
2130-2157z 11,600 kHz
South & East Asia/Australia
15,545 kHz West Africa
2230-2257z 11,600, 15,545 kHz
North America
0000-0027z 7345, 11,615 kHz
North America
0100-0127z 5915, 7345 kHz
North America
0300-0327z 7345, 9870, 7385 kHz*
North America
0330-0357z 11600, 15,470 kHz
Middle East/South West Asia

* Relayed via WRMI Miami, Florida

Radio Prague is this year celebrating the 65th anniversary of its first broadcast. Special QSL cards are offered, and a competition (now closed) has also been running, with the major prize being a trip to the Czech Republic.

SPECIAL ENGLISH

Continuing on the VOA theme, one of the station's most popular segments is the "Special English" service, designed for listeners for whom English is not a first language.

These broadcasts currently go out as follows:

0030-0100z 1548, 1575, 7215, 9770, 11,760, 15,185, 15,290, 17,740, 17,820 kHz
0130-0200z 7405, 9775, 13,740 kHz (all Tues-Sat only)
1500-1530z 1575, 6160, 9590, 9760, 9845, 12,040, 15,550 kHz
1530-1600z 1575, 6160, 9590, 9760, 9845, 12,040, 15,550 kHz
1600-1700z 13,600, 15,445, 17,895 kHz
1900-2000z 1197, 7260, 9680, 13,690 kHz
2300-2330z 7190, 7200, 9545, 11,925, 15,775 kHz
2330-0000z 7190, 7200, 7225, 7260, 9545, 11,805, 11,925 13,735, 13,775, 15,205 kHz

NEW DEVELOPMENT PLANS

"They paved paradise and put up a parking lot," protests the famous Joni Mitchell song.

Well, the former Voice of America transmitter site at Bethany, Ohio has never been "paradise", but it does hold an important place in US broadcasting history.

According to a report in the "Cincinnati Post", passed along by Dan Ferguson, a 30 ha shopping centre is to be built on part of the grounds once occupied by the VOA relay, opening for business in 2002.

The grounds of the station encompass 250 ha in Butler County, and was home to one of the US government's more strategic relays, at its peak during World War 2 and the Cold War.

The VOA moved out in 1994 and donated the land to the local township.

Local authorities are also planning to build a park next to the shopping centre and another parcel of land will be developed as a satellite campus for Miami University, and a golf course.

"FLIGHTWATCH 2001" by **Bob Bell** (VK2UTG)

"United 232 - One in a billion loss of all flight controls"

At exactly 15:16 hours local, Wednesday July 19, 1989, over the American heartlands in the state of Iowa, United 232, a DC-10-10 "domestic" variant of the famous trijet was airborne and cruising at flight level 370 (37,000 feet).

The airliner, with 285 passengers and 11 crew, was on a flight from Denver (KDEN) to Minneapolis/St. Paul International Airport (KMSP). In command, Captain Alfred C. Haynes, a pilot with many thousands of hours on the type, renowned for his cool head, clear thinking, exceptional airmanship, and team-based flight-deck strategies. The flight was proceeding normally, and steaming hot coffee had just been served on the flight deck, to be enjoyed by the pilots.

Without warning, there was a very loud explosion, which the flight crew at first thought was "explosive decompression", but there was no accompanying rush of air, no change of pressure, and no "eerie all-encompassing mist" filling the cabin. The aircraft had suffered a catastrophic engine failure.

Bill Records, the co-pilot who was flying the aeroplane at the time, grabbed the control yoke to take the aircraft off autopilot. The red warning lights on the autopilot were illuminated. - Records had cut the autopilot, or so thought Captain Haynes. In reality, he hadn't - systems were not performing as they should. The captain immediately called for emergency checklists.

The number-two engine is the tail-mounted engine on the DC-10, high on the vertical tail fin. The fan rotor within that engine had disintegrated, exploding and showering bits in all directions, and when it did, due to the positioning of the engine, it caused huge structural damage and loss of control of all three of the giant jetliner's hydraulic and flight control systems. It made the aircraft virtually uncontrollable!

The 2m-diameter fan on the tail engine had in less than one full revolution flung broken fan blades pieces and sundry jagged bits of metal through the right side of the engine housing. It cut a huge gash in the forward edge of the horizontal stabiliser.

A 30cm x 26cm cone section of the tail separated, and it in turn peppered the horizontal stabiliser with in excess of 70 pieces of debris and shrapnel.

That's how the massive damage was done to the aircraft, and its control equipment. The cause of the explosion was later found during an NTSB investigation to be "limitations in inspection and quality control procedures used during engine overhaul, which resulted in a failure to detect a fatigue crack, resulting from a previously undetected metallurgical defect in a critical area of the State 1 Fan Disk." (Source: NTSB/AAR-90/06)

The first checklist item for a problem in the No. 2 engine was "close the throttle", but the throttle wouldn't shut off. Captain Haynes later stated that he'd never had a real in-flight emergency where an engine shutdown was required before, and had only handled shutdowns in a simulator. In the simulator, in an emergency, you pull the throttles back and they close. However, this throttle wasn't playing ball. The second checklist item was to "close the fuel supply off."

But that wasn't happening either! They then tried to actuate the firewall shutoff valve. That move did work however, and shut off fuel to the tail-mounted engine. At that point, the first officer yelled to the captain: "Al, I can't control the damn aeroplane!"

Captain Haynes noticed that full left aileron had been applied by the co-pilot, something you never see in the air, especially at 37,000ft, and the control column (yoke) was fully back in the first officer's lap, calling for full up-elevator. That's another thing you never see in flight in a commercial airliner. With that particular on board equipment in that particular condition, what was the aeroplane's actual attitude right at that moment? How was the aeroplane reacting?

It was in a descending right turn, and the angle of bank was increasing every second!

For the new few minutes, they tried to fly the aeroplane with the control yoke, and it took both pilots all their strength to just get some semblance of control through the now very heavy control. The throttles for No. 1 and No. 3 engines had to also be constantly adjusted, with not much success. The second officer (flight engineer) Dudley Dvorak was on the radio by now, trying to raise the Minneapolis Centre.

Captain Haynes was very lucky that day to have a very experienced and senior first officer, William R. Records on board with him in the right-hand seat, and a talented young second officer, Dudley Dvorak, as flight engineer. He was also again very fortunate to have a senior flight instructor, Captain Dennis E. Fitch, known as "Denny", travelling "dead head" (or up the back with the passengers) on his way to Los Angeles. He was on his way to crew another flight back to the East Coast. However, at this particular moment, Captain Fitch was still with the passengers - he had been reading an aviation magazine.

Captain Haynes now keyed the radio microphone on 126.25 MHz and let the Minneapolis Air Route Traffic Control Centre (ARTCC) know what was happening aloft:

"Err, Minneapolis Center, United two three two heavy, we have an emergency on board here sir!"

(The air traffic controller's worst nightmare was happening in his headset. As is often the case, the word "mayday" was not actually spoken. The word "emergency" was used instead.)

"Center, United two three two heavy, we...err, we were at flight level three seven zero, now rapidly descending through flight level three four five, and have lost all flight controls

The aftermath of the crash

here. We appear to have lost all our hydraulics, and are at the moment having great difficulty just controlling the airplane. There's been a possible explosion at the rear of the aeroplane, and it appears it has taken all our flight controls out. We'd like a vector to the nearest possible suitable airport."

The controller realised that the captain was in fact telling him that he had no ailerons to control roll, no rudders to co-ordinate a turn, no elevators to control the pitch of the jetliner, no leading edge devices to slow them down for a landing. In addition, it meant no trailing edge flaps to be used in the landing, no spoilers on the wings to even slow them down to the diversion airfield, or to help braking on the ground, no nose wheel steering, and no brakes. A very serious situation indeed!

The controller enquired if the captain wanted the emergency services called out. Captain Haynes' quick response was:

"Sure, we need the works, we are having great difficulty just controlling the airplane here!"

The controller advised the captain that KSUX, Sioux City Gateway Airport, was the best option they had. The captain agreed to make Sioux City their alternate, and to attempt to track there. If he could.

Captain Haynes then keyed his mike selecting "intercom" so he could speak to the passengers. He was totally honest with them, telling them the full story, and promising to speak to them shortly with detailed instructions on what to do when they attempted to land. He requested them to obey all instructions given by the cabin flight attendants.

Sioux City in Iowa was the nearest airport with the longest widebody-capable runway, so the Minneapolis Centre controller relayed the information. However, he was wondering how they were going to turn the aircraft toward the airport. In fact, so was the flight deck crew on UAL232.

At this point, Captain Haynes remembered the extra captain sitting with the passengers up the back. Captain Fitch was having the same thoughts and was already walking towards the flight deck. He stopped a female flight attendant and asked her: "Does the captain need a bit of help in there?"

The flight attendant, Virginia A. Murray, responded: "I think he'd love to have you up front right now captain. Go ahead!"

On Fitch's arrival on the flight deck, there was now a total of 103 years of flying experience. Dennis Fitch knew more about the actual systems of the aircraft than the rest of the crew, but as soon as he looked at the instrumentation, he agreed he wasn't going to be of much assistance, as he had never seen anything like this before in his entire airline service.

All the flight controls were virtually useless; of all three hydraulic systems, one system down was a possibility, two unthinkable, but three - never! It couldn't happen! Nevertheless, it was happening. United 232 had all three control systems now inoperable.

An idea came to the four airmen. The controls weren't moving. They were literally struggling with the yoke (control column) and the throttles. Why not take the two wing-mounted engine thrust levers (engines 1 and 3) and manipulate them to achieve a kind-of-control

Rescuers sifting through wreckage

over heading and turns. For the next 30 minutes or thereabouts, that's how they operated the aircraft, and flew it towards the Sioux City Gateway Airport.

At 15:23 hours local (3:23pm), Minneapolis Centre contacted Sioux City controllers on the landline, and told them of the emergency situation heading towards their field:

"I've got a United aircraft coming in, he's lost No. 2 engine, having a hard time controlling the aircraft right now. He's out of 29,000 right now, and descending to Sioux City. Right at this moment, he's east of your VOR, but he wants the equipment standing by. He's east of you by 40 miles."

Captain Haynes keyed the DC-10 radio mike again: *"Ahh, Center, United two three two, we're sort of controlling the aeroplane right now, by juggling the power settings on the thrust levers, the throttles. What was that heading you want us on now for Sioux City?"*

"The cause of the explosion was later found during an NTSB investigation to be "limitations in inspection and quality control procedures used during engine overhaul, which resulted in a failure to detect a fatigue crack, resulting from a previously undetected metallurgical defect in a critical area of the State 1 Fan Disk."

The controller replied: *"Heading two seven five sir, and can you change to Sioux City Approach now on one two four point six?"*

Captain Haynes acknowledged and immediately changed radio frequency to 124.6MHz. He was now in the hands of young Kevin Bauchman, who had left a big-city air traffic control job to have a quieter life in a less-busy area. Now Bauchman was faced with the task of his career!

"Sioux City Approach, United Airlines two three two, heavy, with you, out of flight level two six zero, with heading right now two-nine-zero, and we've got a five hundred feet per minute rate of descent. Okay, so you know we have almost no control ability, very little elevator, and almost no aileron. We are controlling the turns by power. We can only turn right, we can't turn left!"

Kevin Bauchman wanted to get it right. *"United two three two, understand sir you can only make right turns?"*

Captain Haynes reiterated his dilemma. *"United two three two heavy, we're in a right turn here now, that's about the only way we can go. We'll be able to make a few very slight left turns on final, but right now we're just going to make right turns to whatever heading you want."*

Kevin Bauchman needed to confirm how many souls on board. *"Souls"* means every one on board, passengers plus the crew. *"United two three two, say souls-on-board."*

There was silence, then: *"Stand by, right now we don't have time to let go the controls and go call the girl to find out exactly."*

Then, a few minutes after that strained joke from UAL232: *"Two hundred ninety two souls on United two three two sSr."* (Actually there were 296!)

Manipulating the thrust levers, they began a series of turns to the right, because the airplane seemed to want to turn right all the time. They could not keep the power settings the same on the two good engines. If they did, they aircraft would have rolled over!

As if they didn't have enough problems, they then were hit with "phugoids".

These are longitudinal oscillations induced when an aircraft is longitudinally displaced from stable and level flight. Nose up and nose down cycles begin, but it eventually normally dampens out. However, because the engine power settings were all over the place, and those two good engines were wing-mounted engines and were below the centre of gravity, the phugoids never became controllable. Each phugoid lasted 40 to 60 seconds, and made trying to navigate the airplane almost impossible.

The aeroplane had been trimmed for 270-knot flight before the problem explosion, and now, it was trying to return to 270-knot trim. However, the airspeed wasn't there to accommodate that!

Fitch, the visiting captain had been manipulating the throttles almost single-handedly for about 20 minutes now. Dvorak now began to assist him, and they developed a good rapport, and worked as a team very well.

Sioux City Iowa was perhaps the best place in the United States for this kind of emergency to terminate. The local government in Siouxland area had hired a young hotshot emergency management co-ordinator.

He was very gung-ho, switched on and keen, and had insisted in recent months the area had realistic practice runs at mock-up airline crashes and appropriate and full emergency response by police fire and ambulance, and airport rescue fire fighting services.

This human dynamo, Gary Brown, had angered many old-hand emergency service workers and National Guardsmen by doing this. However, he had realised they needed a much more efficient "mutual aid" system, and he had built one up, and was properly managing its resources and personnel.

Brown was very aware that in some cities, even though they had adequate resources, communications were poor between agencies, and that often as not, a fire truck sat a few hundred metres from where it may be needed, just because no one told them about the emergency situation happening on another radio frequency.

As a direct result of his constant drills and practices at the Sioux City airport, sometimes involving in excess of 150 personnel, the airport was totally prepared for the huge job that was unfolding before it.

ANOTHER BIT OF LUCK

The Sioux City Airport Disaster Plan was at that moment highly regarded as the best in the nation, and it was all due to young Gary Brown's sometimes-abrasive insistence. The local hospitals (Marion Health Centre, and St Luke's Hospital) were all involved in the total emergency management package, and many of the hospital staff, doctors, nurses, and so on were involved in the practice drills, setting up tarmac triage points.

Another bit of good luck for Captain Haynes and his crew and passengers was the fact that the 185th Iowa National Air Guard Unit was only active one day a month, on station - and this was the day!

So that meant another 285 trained military personnel were available to assist when the aircraft eventually arrived at Sioux City.

Controller Kevin Bauchman on the Approach console was backed up by a team of five other air traffic controllers, who were working Tower, Ground, and Procedural assignments.

Unlike many Approach/Departure situations at other airports, at Sioux City Gateway Airport, he actually worked alongside the Tower (aerodrome) controller in the Tower cab building. Every one of the controllers present was busily working doing his or her best to prepare the aircraft for the smoothest arrival possible.

Captain Haynes later said of young Kevin Bauchman:

"If you've got a serious problem like we did, and you need the kind of help that doesn't add to the tension level, a voice on the other end of the radio like Kevin's, calm and steady, was a definite influence on us. The only time that Kevin's voice ever cracked was when he realised that we were in position to land on runway two two, instead of the runway three one he originally wanted us on. And that he had a pile of emergency vehicles lined up waiting for us on our now intended landing runway. Kevin had only two minutes to get the emergency trucks and cars out of the way before we arrived. He raised his voice ever so slightly, but then it fell back into the calm, laid back, soothing, here-it-is voice. I later had the opportunity to compliment him on his ice coolness, and he told me to my total disbelief, that he had transferred to Sioux City because he found his previous airport too stressful!"

THE SIOUX CITY VOR WAS ON THE FRITZ

However, that's getting ahead of us. Let's get back to the impending arrival of the DC-10

The DME (distance measuring equipment) at the Sioux City VOR was on the fritz, so the airliner crew was not sure how far they were from the VOR station. Due to some brilliant work by controller Kevin Bauchman, he kept passing their exact radar position to them, and Captain Haynes combined that information with the info from his altimeters and was able to navigate to Sioux City Airport.

Extensive VHF and UHF communications were going on between Gary Brown as emergency dispatch co-ordinator, and the individual ground units. The boss of the 185th Iowa National Guard unit suddenly realised that he had been a bit of a dummy arguing repeatedly with Gary Brown about drills and practices. Now they were going to need all those acquired skills and put the drills into practice in a real life-and-death situation!

Kevin Bauchman keyed his mike:

"United two three two heavy, Sioux City Approach, we have the emergency equipment standing by, and we also have them in your direction".

Captain Haynes responded with:

"We may not actually make it to the airport!"

At 15:51 hours, Kevin Bauchman told the captain:

"United two three two heavy, you are going to have to widen out just slightly to your left sir, to make the turn to final for runway three one, and also to take you away from the city."

That remark really concerned the captain.

"What's your name son?"

"Kevin Sir"

"Well Kevin, whatever you do son, just keep us away from the city!"

By now, things were getting testy, and the crew was worried their aircraft may have to be landed almost immediately.

"United two three two, this is Sioux City Approach, been advised there's a four-lane highway up in that area sir, if you can pick that up."

Captain Haynes advised Bauchman that if they had to land, it would have to be on something very solid. He also said he was trying with his crewmen to bring to aeroplane around to 180 degrees heading, and enquired what heading the controller wanted him to try and fly.

Kevin Bauchman replied that 180 degrees would place the jumbo about 9.2km (15 miles) north east of Sioux City Gateway Airport, and it would then line him up on a three-mile final.

Captain Haynes's response to that was:

"Okay, we're giving it heck!"

The airport was now coming up in the flight crew's 12 o'clock position at 13 nautical miles. Kevin Bauchman now advised Captain Haynes of something that may be useful to him.

"Ah, United two three two heavy, if you cannot make the airport, sir, there is an interstate that runs north to south, east side of the airport. It's a four-lane interstate!"

However, Haynes indicated he was passing the interstate right at that moment, but they were determined to make it to the airfield.

Totally in control, and allowing for unknown quantities creeping in again with the jet's crew, Bauchman contacted emergency dispatch man Gary Brown on a handheld radio. It was a conversation conducted on UHF frequency 451.525MHz, and Bauchman requested all local communities the jetliner was overflying to immediately dispatch emergency vehicles and position them on the roads nearby, so if the aircraft went down, some degree of help would be close.

Communications between the flight deck crew and the cabin crew kept flowing, so flight attendants were well informed about developments up front, and could assist in preparing the by-now very apprehensive passengers. Even though the passengers were scared, the excellent cabin crew under the leadership of. Janice T. Brown kept them calm and under control. A very important factor towards their ultimate survival.

PROBLEM-SOLVING APPROACH

Captain Haynes was an exponent of and practiced CLRM (cockpit leadership resource management). At the time, this was revolutionary cockpit management strategy. He had started following this line of thinking after hearing of air accidents where the captain's word was law and no one on the flight deck dare question it.

The Haynes method was a problem-solving approach, where the ideas were actively encouraged even from the most junior crewmember. *"Ask an astronaut if he got to the moon by himself. I don't think so."* (Haynes)

Bauchman advised the stricken jetliner crew that they were very close and should soon have the runway in sight.

"United two three two, advise when you get the runway in sight."

"Ahh, United two three two, have the runway in sight. We'll be with you shortly son, thanks a lot for your great help!"

"United two three two heavy, the wind is currently three six zero degrees at one one knots, and you're cleared to land on any runway!"

Captain Haynes then started laughing, and responded with some humor in this very tight situation:

"You want to be particular and make it a runway huh?" (Still chuckling)

"There is a runway that's closed Sir, runway two two, that could probably work. It runs north east to south west."

The airliner had been up until this point

loosely lining up for runway 31, but unfortunately the inability to positively control it saw it going through that heading - 310 degrees - and continuing through to almost 220 degrees. Haynes then came up on the radio and said:

"We're pretty much lined up on that one, runway two two is it, okay we'll take that one. And by the way, we've only got one chance at this, no go-rounds possible."

Bauchman almost had a stroke when Haynes told him he was using RW 22 instead of RW 31. He had the waiting fire trucks, police cars, ambulance and National Guard vehicles lined up there anticipating the arrival. National Guardsmen were watching the jet approach through binoculars. Bauchman spoke to Captain Haynes again:

"United two three two heavy, that closed runway will work sir, I'm getting the equipment off the runway now, so line up for that one."

"How long is it?"

"United two three two heavy, six thousand six hundred feet, and the equipment is definitely moving off now." (Thirteen seconds elapse) "It's just a wide open field sir, so the length won't be a problem. It runs into an adjacent cornfield. God be with you captain!"

The aircraft came over the airport fence line shortly after, and touched down on the right main landing gear initially, at very high speed. The right wing tip then struck the ground, and right after that, the No. 3 (right wing) engine hit the deck.

The nose wheel heavily impacted, and the left main undercarriage slammed into the ground hard.

Touchdown speed was 215 knots (normally 140 knots) and the rate of descent was 1,845 feet per minute. Normal descent is 300 feet per minute.

The tail of DC-10-10 registered N1819U (United 232) then completely broke off, along with the right wing tip, which was now spewing fuel.

A fire immediately broke out from the sparks and the DC-10 slewed along the runway. The left wing wanted to fly again. It did, and then came back down hard, and as there was no weight in the tail, the aircraft bounced down hard on its nose. The aircraft became airborne again, and the flight deck now separated and rolled away several hundred metres, trapping the pilots inside what looked liked an uninhabitable piece of junk to rescuers who were soon on the scene.

ALMOST ALL OF IT WAS ON FIRE

The rest of the jetliner was strewn in pieces along the runway, and in a nearby cornfield. Almost all of it was on fire. Many died, or were dying.

The emergency services were right on the job. Airport safety and security officer Jim Felton told Bauchman, who had continued to handle the flight right to its crash landing, that sightseers were entering the airport from the cornfield area. He said he would go to keep them away from the disaster site. Then, to his total amazement, he realised they were survivors of the crash, not rubbernecks!

"Tower, these people are survivors walking here in the cornfield! Survivors! People are alive. Some of them are carrying small children. Some are half naked. (He was crying by now.) I'm rendering assistance."

Felton powered his 4WD towards the survivors walking out of the cornfield and approached a group that looked like a family and helped them. A total of 185 passengers and crew had survived, including the technical crew on the flight deck. One of the survivors later died in hospital, weeks down the track.

At first National Guardsmen didn't even recognise the scrambled heap of metal sitting on the end of the runway as the flight deck. Suddenly one of them realised there were people alive inside the tiny metal "coffin". He had heard a low moan from inside the metal tomb. He yelled to his fellow guardsmen:

"My God, it's the flight deck, the Captain and his crew are trapped in here!"

HE WAS A TRUE HERO

The guardsmen had been listening to the captain prior to landing on a handheld aircraft radio.

They later said that at this point, looking at the crumpled metal and hearing the captain's familiar voice inside, but not being able to see him yet, a strange warm feeling of respect and admiration came over them for this man, Captain Alfred C. Haynes. He was a true hero who had saved many lives.

The four flight crewmen were soon released from their metal cocoon, covered in their own blood, but they were alive. In the main part of the fuselage, one flight attendant, a female, had perished in the crash.

The guardsman who had first realised the hunk of metal was the flight deck was talking to the captain as he was finally lifted clear and placed on a stretcher.

"Captain, you've done a great job sir. There are lots of survivors."

William Records, the first officer had broken both hips, eight ribs, a toe, and suffered numerous bruises and contusions to his body.

Dudley Dvorak, the second officer flight engineer suffered a shattered right ankle, multiple bruises and contusions, and now has three pins in his right leg. The right ankle is permanently aimed off a bit to the right, and he has a permanent limp. He has now had the ankle fused.

Dennis Fitch, the "dead head" pilot who came forward to help out, suffered multiple bruises, contusions, a broken rib, internal injuries, a severed nerve in his right hand, a dislocated left shoulder, and a broken right arm.

The captain, Alfred C. Haynes, hero of the day, was relatively uninjured, with a slight cut on the right ankle, bruises, contusions, a black eye, and head lacerations requiring 92 stitches, but had no broken bones.

Bill Records, Dudley Dvorak and Captain Haynes returned to work just three months after the crash. Dennis Fitch, the pilot who had come in to the flight deck to help out from the passenger cabin, was the most seriously injured, but even he was flying again just under a year later.

As earlier stated one flight attendant was killed, the rest being injured, but they all those who survived managed to return to work.

Unbelievably, even though injured, they were still doing their jobs after the crash, and had to be "relieved" by the emergency services personnel from giving first aid to others, and assisting and comforting their passengers.

Just on 45 minutes after the crash, all passengers and crew who were left alive had been treated on scene at the runway triage, stabilised, and transported to hospitals.

Some weeks later, in St Luke's Hospital, a young man asked where Captain Haynes bed was so he could visit him. The captain overheard, and shouted:

"Kevin! ... Kevin Bauchman! Come over here son, you did a great job! You were so calm! I would know that calming voice of yours anywhere!

This story is dedicated to the flight crew of UAL232, Alfred Haynes, William Records, Dudley Dvorak, and Dennis Fitch, along with air traffic controller Kevin Bauchman, and emergency services co-ordinator for the Siouxland area, Gary Brown.

I'm sure you'll agree it is a tale of overwhelming courage, professionalism, heroism, and an outstanding team effort. It made an "unsurvivable" air accident "survivable" for 184 of the souls who were on board.

There's a big lesson for communities here, to have an organised, practiced and updated emergency plan. It's not just the jobs of the police, fire, and ambulance, and the airport rescue fire fighting services. There's a clear message here.

FOOTNOTE

Captain Haynes was still flying for United Airlines when I last checked, back in 1992. He had begun working for the company in 1956, and had logged more than 35,000 hours of flight time, with more than 8,300 hours in the DC-10.

He was initially a DC-10 first officer in 1976, and was trained on the widebody as a captain in 1987, after a stint as a Boeing 727 skipper between 1985 and 1987.

Kevin Bauchman is still an air traffic controller, living and working in the Siouxland area of Iowa USA.

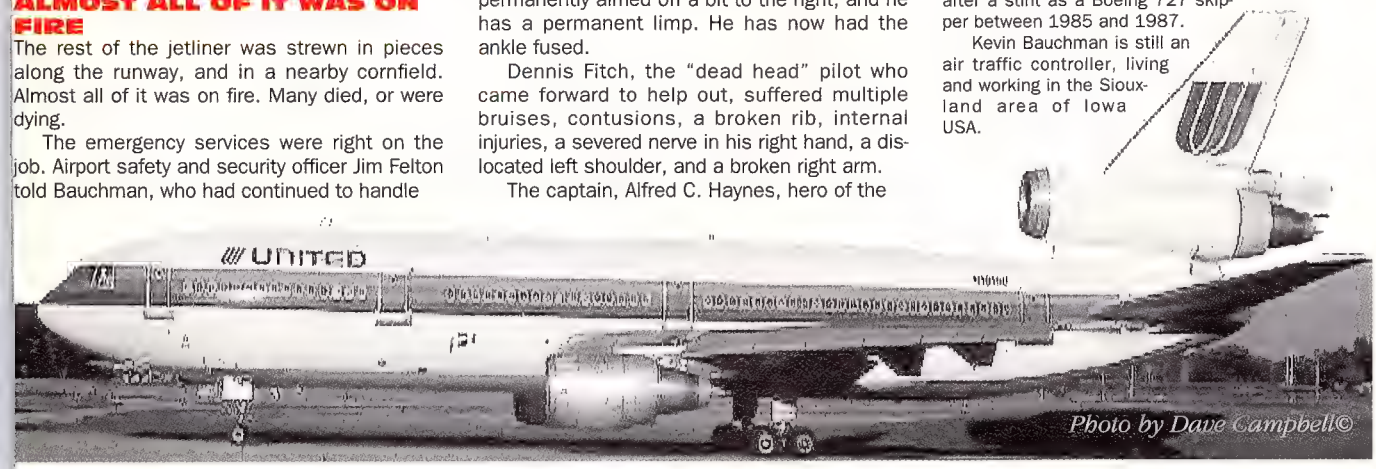


Photo by Dave Campbell©

DX & BAND REPORT

By **Jim Smith, VK9NS**
PO Box 90, Norfolk Island, South Pacific 2899

Since the last column, I finally have the 11-element LPA beam and 80-foot tower down, and in the past two weeks have completed much of the badly needed maintenance work.

It has at times seemed a never-ending job but it will have been a worthwhile task once it is over.

Right now am just waiting for some stainless steel hardware to arrive. Everything should be back in place within a week and we will be back in business. Nevertheless, without the beam our standby three-band vertical system has worked very well indeed, the main disadvantage being reduced receive signal on occasions.

Israel ***4X4***

Gunther, OE1GZA/DH2GZ has reported that the Israeli telecomm authorities have now allocated the 4Z8 prefix for foreign radio amateurs living and working in Israel for more than one year. Gunther has been issued the call 4Z8GZ and Marc, WC1X has been issued the call 4Z8BB. Both stations are currently active.

QSL route:
4Z8BB **WC1X**
4Z8GZ **DH2GZ**

If you would like to know more, try the following site for more details.

http://hamradio.iarc.org/cept/4Z8Cal-Sign.html

Somalia ***T5***

It has been good to have T5, Somalia so active in recent days (as I write this) and Tom, DL1QW signing T5W and Baldur, DJ6SI signing T5X have been very active. Baldur was as usual handling the CW demand and he is a very good operator - a CW machine in fact. Tom, T5W has been active on the various bands on SSB and RTTY. I was able to get him okay a few times even with my vertical but, in particular, a new one on RTTY.

T5, Somalia is lying at number 60 on the ARRL DXCC listing. The last valid T5 operation was in 1995.

QSL route: **T5W** **DL1QW; T5X**
DJ6SI;
Thomas Lind, DL1QW,
Saturnstr. 1,
D-44579 Castrop-Rauxel,
GERMANY.
Baldur Drobnica, DJ6SI,
Zedernweg 6
D-50127 Bergheim,
GERMANY.

NB: Bruce, WD4NGB, reports the call-sign T5DX had been issued to his group for their planned operation in September, but thinks that it is now unlikely that his group will go to T5, Somalia as previously announced.

Chagos ***VQ9***

It seems that VQ9, Chagos is very active these days. It is reported that the island now has eight operators and there is also the club station, VQ9IO, which has premises with three operating positions.

Paul, W2JDK is VQ9PH and his son Mike, KC2AYL is VQ9MH and they should both be active until late September, with Mike scheduled to stay a couple of weeks longer than his father. Logs for Paul and Mike are e-mailed on a regular basis.

QSL route: **VQ9MH/VQ9PH**
W2JDK

Chesterfield ***TX0***

In a recent release Bill, VK4FW, reported that due to the difficulty in getting enough operators together and other factors the planned September DXpedition to TX0, Chesterfield Reef by the ODXG has been postponed. It may actually be cancelled altogether. The multi-station DXpedition was scheduled for the first couple of weeks in September, but Bill says that he may try at a later stage to make Chesterfield a possibility.

TX0DX QSL

It seems that Kirsti and I finally have our TX0DX QSL cards sorted out after a second attempt at QSLing. Kirsti was unlucky as her SSB (Phone) QSL card was bounced - 'Not in Log'. Fortunately, this matter has now been sorted out.

On checking their logs there was an entry for VK5NL and Kirsti has now sent a letter received from VK5NL certifying that he did not work TX0DX. This letter now clears the way for an official TX0DX 'Log Correction' to be made, since it is now deemed to be an operator error!

I have never believed in the infallibility of neither DXpedition nor DX operators in terms of log keeping. Add real-time computer logging, re-typing hard logs into computer form (after a DXpedition) and there is more room for errors.

My own experiences with several hundreds of thousands of personal QSOs shows that errors can and do creep in, however one does have to have the actual original log to be able to check.

Vietnam ***3W***

Mal, VK6LC is reported to be back in back Vietnam and he has been reasonably active signing 3W6LC. He is operating from Ho Chi Min City and should be back in VK6 as you read this.

QSL route: **3W6LC**
VK6LC.

Claude, 3W2KF, F5PBL apologises for the delay in his own QSLing which was due to his participation in the recent JW0PK DXpedition. He now expects to have all of the direct requests answered by the end of the month.

QSL Route: **3W2KF**
Claude Terrier, F5PBL,
18 allee du Mail,
F-92360 Meudon-la-Foret,
FRANCE.

East Timor ***4W***

It is reported that Thor, 4W6MM is back in Dili, East Timor once again with an improved station. His C3SS beam is at about 46m (150ft) along with a 6m beam. The amplifier is the Emtron DX-3 and he expects to be active as his duties permit. There are no plans for low-band operation just yet, mainly due to heavy local broadcast interference. However, Thor will try to do something about activity on 40m in the near future.

QSL Route: **4W6MM**
Thorvaldur Stefansson,
PO Box 3699,
Darwin,
NT 0801,
AUSTRALIA.

ARRL DXCC Challenge

As mentioned in this column from time to time, the name of the DX game to many is multiband QSOs. This of course does make the

high DXpedition totals the reality they are today. The ARRL 5-Band Award has been around for a long time now and required confirmed QSOs with 100 countries on five bands. Endorsement for 160m became available.

ARRL have now created the DXCC Century Club Challenge Award. This DXCC Challenge will recognise combined totals for the nine DX Bands of 160-10m. The entry level is 1000 band-entities and all QSOs must be made and confirmed for QSOs since the November 15, 1945.

Part of the good news is that if you are already a member of the DXCC and since the ARRL DXCC programme is being tracked by computer these days, it will now also 'track' your Challenge total. It is planned to automatically alert you with a letter of congratulations when your band totals reach that magic 1000.

An ARRL Challenge Plaque will be available.

The award will then be endorsed in steps of 500 and this will be in the form of a medallion for the Challenge Plaque.

It all sounds like a good idea, and I am sure it will catch on.

Check www.arrl.org/awards/dxcc/ - your existing band totals should be there.

NB I have just checked that DXCC listing very quickly and my call is there at position 319 with 1189 entities, I have no WARC band claims. I did note that Mike, VK6HD is also listed a few spots lower. I did not do a comprehensive search but the system does work.

Papua New Guinea ***P2***

Was happy to work Ron, P29IO, on 17m SSB the other day. He has been active on the various bands and note here that he has also been reported to be active on CW.

QSL route: P29IO
VK3IO.

Madagascar ***5R8***

There has been plenty of activity from 5R8, Madagascar lately and it used to be a rare country. I worked Bert, PA3GIO who was very active from one of the 5R8 islands (Sainte Marie) signing 5R8GY. The following 5R8 stations have also been reported active recently, Solfono, 5R8ET, Andreas, 5R8FL, and Ake, 5R8FU.

NB. I wonder if you saw those superb TV clips of the solar eclipse that was also apparent in Madagascar?

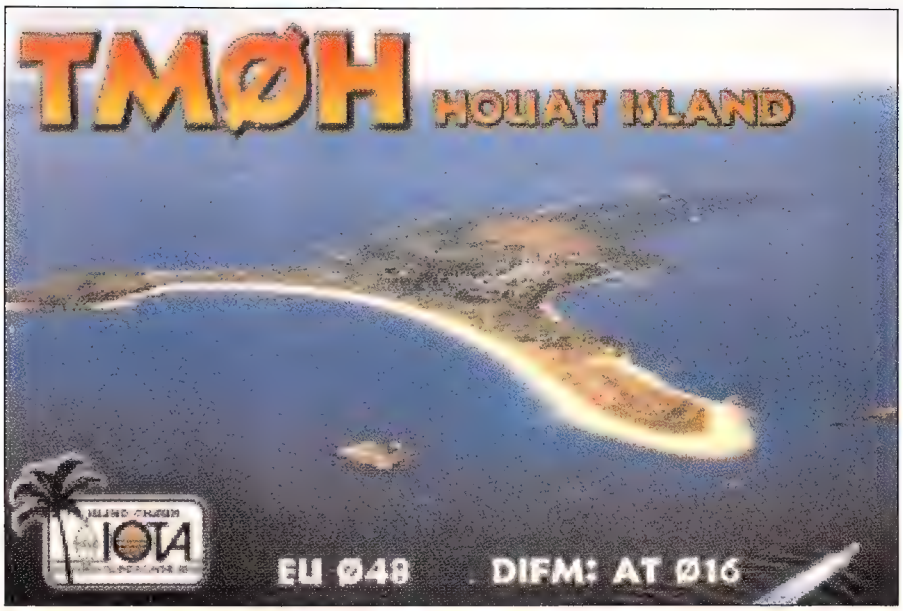
QSL route: 5R8GY
PA3GIO

Mozambique ***C9***

Have been lucky with Joe, G0MRC who is currently in C9, Mozambique and have worked him on a couple of bands. He is on an installation contract, which takes him to several areas of the country. A different prefix is used in each province and he hopes to be in the Northern Provinces in late July. His has been signing C93MR recently in Beria.

He hopes to be able to get on the air from Capo del Gado and Niassa provinces with the call C97MR, and from Nampula province as C96MR. Stops are also planned in the capital city, Maputo, from time to time, operating C91MR.

Joe will have his Kenwood TS-50 and a SCS PTC-II modem for operation on PSK31, RTTY and Pactor.



It seems that the plans for that possible DXCC entity of Ducie Island is gathering momentum and I received an update from Kan, JA1BK. Here is what was released to the DX outlets. We wish the Pitcairn Island Amateur Radio Association every success in this venture in the name of IOTA and DXCC.

'PIARA Announces DXpedition to Ducie Island'
By Kan Mizoguchi, VP6BK
IARU Liaison Officer
Pitcairn Island Amateur Radio Association

The Pitcairn Island Amateur Radio Association announces that it will undertake an IOTA DXpedition to Ducie Island, with operations to begin at 0000 UTC on November 16, 2001. This operation will utilise three stations operating around the clock, with emphasis on providing contacts to as many different individual stations as possible.

The leader of the DXpedition is well-known operator Tom Christian, VP6TC, president of PIARA. Other DXpedition members are VP6DB, JA1BK/VP6BK, JA1SLS/VP6BB, JF1IST, and three other operators to be named later. This international DXpedition will be attempting to provide worldwide coverage for this rare IOTA, OC-182. Satellite log checking is planned by the team.

Ducie Island is 360km from Henderson Island, the nearest land, and surrounded by water up to 3000m deep. It is the easternmost atoll in Oceania, and rarely visited.

Because of its remoteness, conventional transportation is not available, and an adequate size boat is needed to make the journey.

Arrangements have been made for a charter, and landing permission has been obtained for the date selected. Because of ecological concerns, only one group may be on the island at any one time.

PIARA has filed an application for membership in the IARU. This application has been approved by Region 3, and the application has been forwarded to the full membership of the IARU for final approval.

Support for this DXpedition is being provided by Yaesu (Vertex Standard), Create Design, and Suzuki Motors.

The QSL manager will be Garth Hamilton, VE3HO, and the pilot station will be Dr. Bill Avery, K6GNX.

Further information will be provided as the date approaches.

It is still early days but the Region 3 approval for the IARU application by the PIARA is good news and as further updates are made, I will let you know. These dates may coincide with the actual IARU Vote and decision and my own view is that the IARU decision will be a 'yes'.

This weekend at the W3LPL open house John Kanode, N4MM, reported the IARU societies have until November 15 to submit ballots for Pitcairn's membership into the IARU. If the vote is positive, Ducie Island could be added to the DXCC list with contacts made starting at 0000Z on November 16, 2001.

You may wish to check out Kan's, JA1BK, home page at; http://www.iijnet.or.jp/JA1BK/index2.html

QSL route: All C9*MR via;
Joe, G3MRC,
18, Grosvenor Avenue,
Kidderminster,
Worcs., DY10 1SS,
ENGLAND.

Reunion Island FR

Bert, PA3GIO has now finished his latest DXing trip with his last activity signing FR/PA3GIO and he was easy to work from here.

QSL route: FR/PA3GIO
QSL via PA3GIO.

Pat, F5LBM/FR5FD, should now be back on Reunion Island and plans to have a new 600 watt linear amplifier on line. He likes the WARC bands and CW.

QSL route:
F5LBM/FR
F5LBM

Malpelo HK0

After the recent marathon operation by Pedro, HK3JJH/0M from Malpelo, QSL manager Carl, N4AA, reports that QSL cards for the operation are being processed with batches of cards going out every day. He expects to have all of the direct requests answered by the end of July at the latest.

Both Jairo, HK5MQZ/0M and Hiro, HK5QGX/0M have also been very active on all bands this past couple of weeks, providing yet another chance at this normally quite-rare DXCC entity.

QSL route: HK0MQZ/0M
Jairo Vargas, HK5MQZ,
PO Box 10862,
Cali,
COLUMBIA.
HK0QGX/0M
JA0MGR.

Greenland OX

It is reported that the OX2K DX group of Greenland is planning to be active in the CQWW SSB Contest later this year. They hope to use the call sign XP1AB once again.

Market Reef OJ0

The planned DXpedition to OJ0, Market Reef by a group of LA stations is still on track with scheduled dates August.5-8.

Bouvet 3Y

Sanity has prevailed and Mac, WA4FFW, reports that he now hopes to receive the blank 3Y0C QSL cards by the end of July. He plans to do everything possible to clear the 3Y0C QSLing by mid-September and so will give DXers a chance to meet that annual September 30 ARRL deadline for DXCC submissions.

QSL route:
3Y0C
WA4FFW

Netherlands Antilles PJ

It is reported that Tom, AE9B, and Marty, NW0L, plan to be active from the Netherlands Antilles during September 1-10and will be active in the WAE Contest which runs over the weekend of September.8 and 9. Callsigns are PJ2/AE9B and PJ2/NW0L the week before the contest.

QSL route: PJ2/AE9B, PJ2/NW0L
Via Home Calls.

Tristan Da Cunha ZD9

Further to the recent evacuation of the island, Andy Repetto, ZD9BV, and his wife Lorraine, ZD9YL, are still in England. Last week the two received a gift of a Yaesu FT-102 thanks to Didier, F5OGL.

The couple plans to be back on Tristan da Cunha in September and then QRV. DXers around the world thank Didier for his generous donation.

From DXpeditioner to Ambassador

The ARRL reports that Radivoje "Rasa" Lazarevic, YU1RL, is the new ambassador to Brazil. Lazarevic is a well known DXpeditioner and contester, having participated in the 2000 WRTC and operated from both Brazil and Fernando de Noronha.

Congratulations to Rars, YU1RL.

SPECIAL-EVENT STATIONS

Ukraine

The special event station EN1WJP should have been QRV on all bands and modes from June 22-27, commemorating the visit of Pope John Paul II to Lviv City, Ukraine. A commemorative award will be issued for all making make five QSOs with Lviv's stations, usually with the letter W following the prefix (i.e. UR5Wxx, UT4Wx, etc.). A QSO with EN1WJP is mandatory; you can make all QSOs with the special-event station if they are made on different band/modes.

The fee for the award is three IRCs or US$2. GCR list must be sent to UR4WG.

QSL route: EN1WJP via the QSL Buro or direct to;
UR4WG,
PO Box 7072,
Lviv, 79018,
UKRAINE

Poland

3Z0GI has been issued to mark the 666th Anniversary of Gorrowo Iaweckie town and will be valid until July 30.

QSL route: 3Z0GI
SP4CUF

St Kitts and Nevis V4

In a release from Lawrence, KJ4UY he reports that he will be operating on all bands including 6m on SSB, CW, RTTY and maybe PSK. He will sign V47UY from Nevis Island at the QTH of V44NK between July 20-31st.

Thailand HS

It is good to note that amateur radio is still growing in HS, Thailand. In a recent radio amateur examination held on May 26some 15 Thai nationals passed the HF status examination. One of the callsigns since issued was HS0XNO who plans to get on the air as quickly as possible! Good for him!

St Pierre and Miquelon FP

Don't know about you but I have always found that QSOs with FP, St Pierre and Miquelon very rare over the years. Good news is that Pete, NN9K; Peg, KB9LIE and Paul, K9OT, will be active on 80-10m SSB and CW with a possibility of 6m (we should be so lucky) signing FP/home calls starting July 26 until the August.1

NB. They plan to be in the IOTA contest FP/K9WM but before and after the contest they will concentrate on the WARC bands and PSK31.

QSL route: FP activity
FP/Home calls via home calls,
FP/K9WM via NN9K.

Monaco 3A

It is reported that Gerry, IZIDSH, is planning a trip to 3A, Monaco, and will operate as 3A/IZ1DSH. He will be active on 40,20,15 and 10m. Dates of the operation are August 4-10.

QSL route: 3A, IZ1DSH
Via home call direct or via QSL Bureau.

Thanks is due to those who keep me informed and a special word for Paul, VK2HV and Jon, VK4CY and others with those 'alerts' from time to time.

QSL INFORMATION

9H3RK	R. Karhammer, PO Box 9274, Dar-es-Salamm, TANZANIA.
6Y4Y	Florin Ionica, PO Box 161, Kingston 7, JAMAICA.
9Z4CT	Nigel Darwent, PO Box 20, San Fernando, TRINIDAD.
A41LZ	Murtadha Ahmed Sultan, PO Box 2837, Ruwi, Muscat 112, OMAN.
CE3BFZ	Pedro A. Barroso. PO Box 3159, Santiago, CHILE
CN2DX	Andre Breguet, HB9HLM, Beausite 18, 2014 Boles, SWITZERLAND.
CN8LI	Said Sidate, Rue Myidriss, Zerhoune Souissi, Rabat, MOROCCO.
CQ9KPO	PO Box 19, P 9001-901, Funchal, CHINA.
CX8CP	Gerardo Otero, PO Box 6000, 11000 Montevideao, URUGUAY.
E4/OE1ZGA	Guenther Zwicki, C/O Sict, PO Box 1133, Ramallah, PALESTINE.
ER1LW	Lysy Wyacheslav, PO Box 112, Chisinau, MD-2012, MOLDOVA.
EX2T	Vlad Udovin, PO Box 745, Bishkek 720017, KYRGYSTAN.
JD1BJN	Satake Shichiro, 15-6 Soya 7- chome, Ichikawa City, 272-0832, JAPAN.
N2OO	Bob Schenk, PO Box 345, Tuckerton, NJ 08087, USA.
TI5KD	Carlos William Diez, PO Box 195, Belen Heredia 4005, COSTA RICA.
XX9BB	Leong Kam Po;, PO Box 6018, Macao, CHINA.

ISLANDS ON THE AIR

By **Jim Smith**, VK9NS/MØBJI, Official Pacific IOTA checkpoint

It has been rather nice to receive a number of enquiries on IOTA from VK stations since the last issue of the IOTA. The queries covered several areas but with any luck, it seems that we may have a few more active operators joining the ranks of the island hunters.

I will take a few minutes of your time just to cover a couple of easy points that were raised in the queries mentioned.

1. The IOTA Program is now run by the RSGB as part of its overall activities in the name of amateur radio. It was a major change in policy, making the RSGB a participant in an international competitive award program, so moving outside of its more normal inward-looking National Society outlook.

2. The IOTA program is driven by an IOTA committee of very active UK radio amateurs with a totally 'hands-on' approach. The method of administrating the claims for the various IOTA awards is by of means of computer-driven software that keeps track of all the valid callsigns of stations which activated this or that island. The software is utilised by all IOTA checkpoints as a means of checking all QSL cards being submitted for an update claim for an island.

3. The checkpoint is of course the place where a new callsign (not listed in the software) is in effect added to the Good Call database. The check point has the card in hand, can see that it clearly indicates an island location, and under new rules does actually have the IOTA number printed on the card.

The software has alerted the checkpoint that 'this is a new callsign' XX9XX has never been submitted before in a claim for island XYZ.

The checkpoints can over-ride this by accepting the QSL and in doing so, this callsign is then added to that 'Good Call Sign' database.

NB. Frequent checks are made on the callsign/island submissions to HQ and this keeps the information on track. The checkpoints are 'shut down' (No Work period) allowing them to return their data base info to HQ where they are all amalgamated into the new current HQ IOTA Dbase. This is then e-mailed to the check points which then over-writes its IOTA files and all check points are now back in step using the same data base to check incoming claims.

4. There is still some confusion over the IOTA Directory and islands in general. Individual islands are not necessarily all given individual island numbers (although as an example, Australia is OC-001) as a moment's thought will indicate this would be an impossibility to administer.

The actual number of islands is virtually unlimited.-.from memory, Indonesia has some 15,000.

You may recall that last issue it was mentioned that the RSGB IOTA program had just issued the thousandth number for an IOTA island or group number.

5. The RSGB produces and sells the IOTA Directory and the purchase of the Directory (all individually numbered) makes one part of the IOTA program. This number is required when registering into the program at the local checkpoint with that first IOTA Island claim.

6. The RSGB IOTA Directory lists all valid islands (or groups) which qualify for the various IOTA Awards. It also has all the rules and regulations giving the answers to all of those normally asked questions. It is a quality item and a measure of the quite incredible effort that has been put into the IOTA program over many years.

7. Check http://www.rsgbiota.org for further info on directory.

Meanwhile, out and about there has been a large increase in IOTA activity from Europe, which has been helpful in tidying up a few 'holes' after all those changes last year.

My own list of needed European islands has now dropped back once again to just a few. Propagation has also been good enough to catch a bit of the African activity and the activity by Bert, PA3GIO from AF-090 was very welcome.

AF-004	EA8AG	Canary Islands	QSL CBA
AF-027	FH/PA3GIO	Myotte Island	QSL PA3GIO
AF-083	3V8SM	Djerba Island	QSL DL1BDF
AF-090	5R8GY	Sainte-Marie	QSL PA3GIO
AS-004	5B4KH	Cyprus	QSL CBA
AS-004	5B4MF	Cyprus	QSL CBA
AS-015	9M2/JI1ETY	Penang Island	QSL JI1ETY
AS-018	RSOF	Sakhalin Island	QSL W3HNK
AS-018	UAOFO	Sakhalin Island	QSL UAOFO
AS-159/p	YMOKI	Kefken Island	QSL TA2KI
EU-011	G3HTA/P	Scilly Island	QSL G3HTA
EU-012	GM4CHX/P	Papa Island (Shetlands)	QSL GM4CHX
EU-028	IA5/IK5AMB	Gorgona Island	QSL IK5AMB
EU-032	F/DJ5MT	Oleron Island	QSL DJ5MT
EU-048	TM1H	Houat Island	QSL F6ANA
EU-052	SV8/DL4JWU	Korfu Island	QSL DL4JWU
EU-053	OJOVR	Market Reef	QSL OH2VR
EU-053	OJO/OH3RM	Market Reef	QSL OH3RM
EU-056	LA9VDA/P	Gossen Island	QSL LA9VDA
EU-063	JWOPK	Prins Karls Forland Is.	QSL SP5DRH
EU-075	SV1TP/P	Hydra Island	QSL SV1TP
EU-110	9A6XX/P	Sveti Nikola Island	QSL 9A6XX
EU-129	DFORU/P	Usedom Island	QSL DFORU
EU-174	J48SAM	Samothraki Island	QSL SV2FPU
EU-174	J48T	Gavdos Island	QSL ON4AAC
EU-177	8S5T	Harstena Island	QSL DF6JC
EU-187	J49HW/P	Chrysi Island	QSL HAOHW
NA-041	KL7XL	Barnhoff Island	QSL CBA
NA-045	XF3/KB5SKN	Mujeres island	QSL AB5EB
NA-073	KM4RX	Anna Maria Island	QSL KM4RX
NA-125	VE2MAM/P	Grand Basque Island	QSL VE2MAM
OC-247	YB8HZ/P	Sabalena Islands	QSL YB8HZ
OC-088	YC7SKM	Borneo Island	QSL YC7SKM
SA-007	HK5MQZ/HKOM	Malpelo Island	QSL HK5MQZ
SA-007	HK5QGX/HKOM	Malpelo Island	QSL JAOMGR
SA-088	PSA088	Tacami Island	QSL PP5LL

NB. Market Reef was only active for a couple of days - I heard them one morning but light copy here.

Millennium IOTA 2000 Award

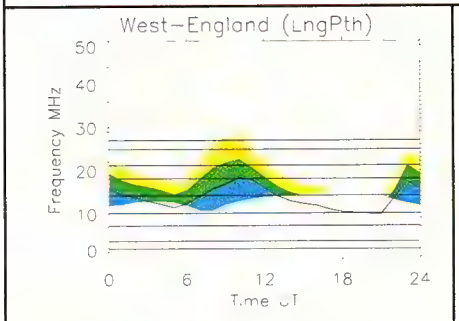
In a recent release from Neville, G3NUG he notes that some 232 applications for the RSGB IOTA Millennium Program (IOTA 2000) certificates have been processed so far. The closing date for IOTA 2000 applications is December 31.

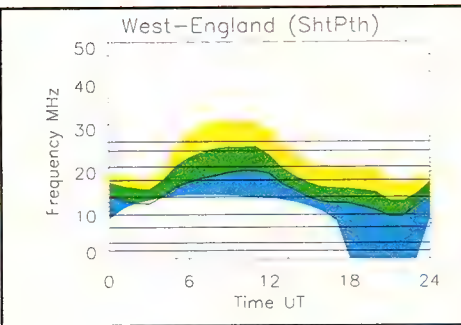
The winners, by category, are shown on the Chiltern DX Club Web pages at http://www.cdxc.org.uk

QSL INFORMATION

9V1XE Mirek Rozbicki, 7, Seleter Terrace, Singapore 806908, SINGAPORE.
JWOHS Box 127, 9178 Barentsburg, Svalbard, NORWAY.
JW4WJ Hoie Jostein, LA4WJ, Hoveveien 155, Sandnes 4323, NORWAY.
OX2NU Box 875, Nuuk, GREENLAND.
VP8DCD Box 260, MPA, FALKLAND ISLANDS.

Propagation For





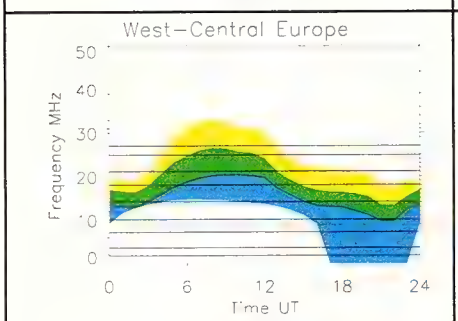
ABOUT THESE CHARTS

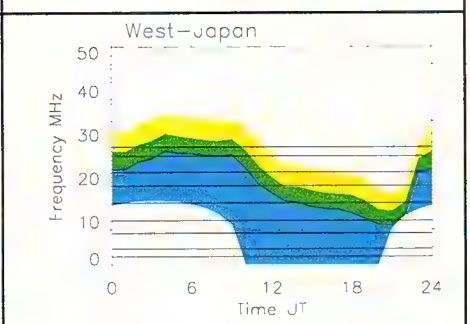
The data on these pages are graphs showing forecasts for expected HF operating conditions between Australia and a number of important DX destinations. The information they contain is prepared by **IPS Radio and Space Services**, a division of the federal Department of Industry, Science and Tourism. IPS monitors changing radio conditions — which are affected most greatly by fairly predictable changes in solar activity — and issues reports and warnings based on that data.

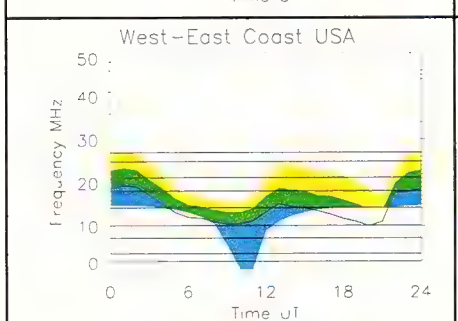
Stations in the eastern half of Australia should refer to graphs on the left hand page. The data on the right hand page is calculated for stations in the western half of the continent. Of course, if your location is in the middle of the continent try reading them *both*... then make an educated guess.

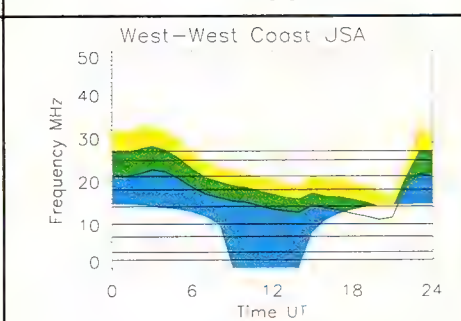
The horizontal axis of each graph represents the hour of the day expressed in Universal Co-ordinated Time or UTC ('z'). The vertical axis shows the entire HF spectrum with a horizontal line representing each HF amateur band.

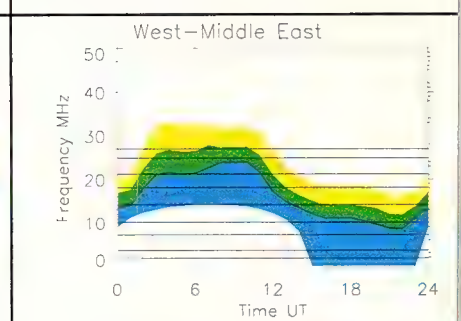
The maps are easy to read. First go to the map which looks closest to the area in which you are interested. Look *up* from the time and *across* from the frequency to the point at which the two variables merge. Note which grey scale — if any — appears at the intersection of the particular time and frequency combination for that area and refer to the legend (right) to find the sort of propagation most likely to apply. If the space is blank the forecast is not good — your time and frequency combination is unlikely to allow communication to the destination station.

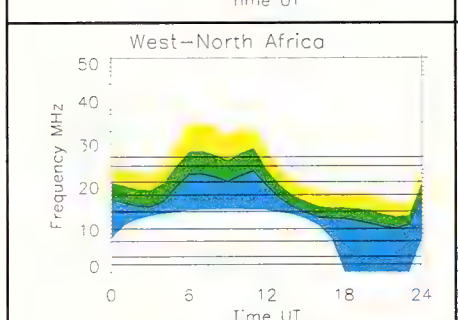


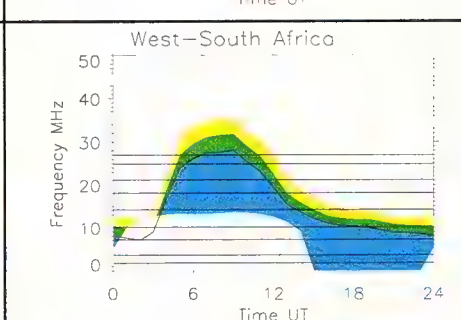


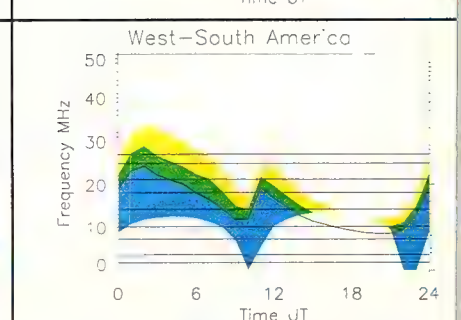


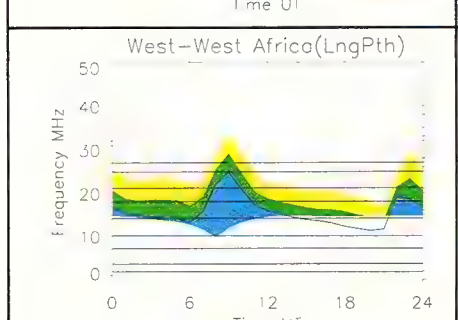


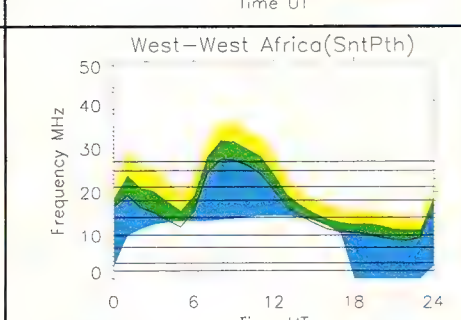


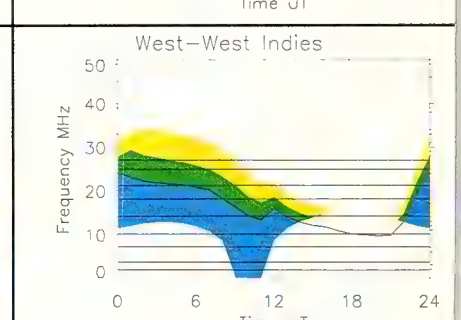




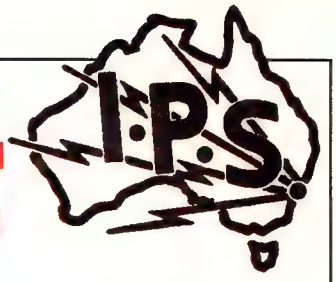








aster August



LEGEND

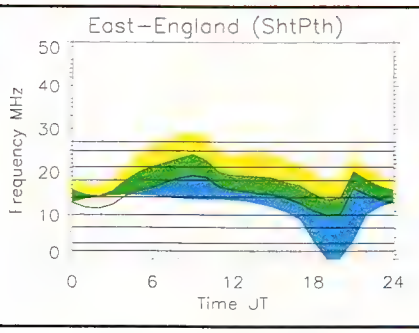
UD Upper Decile — You have a 10% chance of getting through.

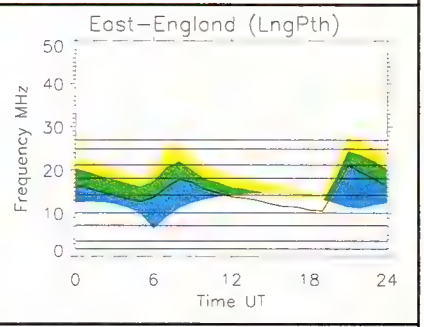
MUF Maximum Usable Frequency. 50% chance to get through.

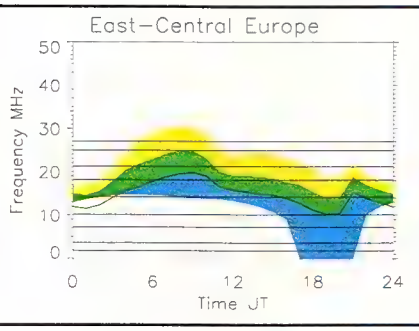
OWF Optimum Working Frequency. 90% chance of a contact.

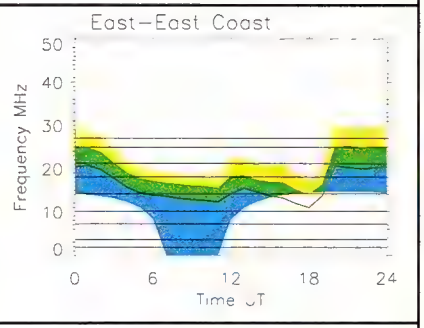
EMU E-layer Maximum Working Frequency.

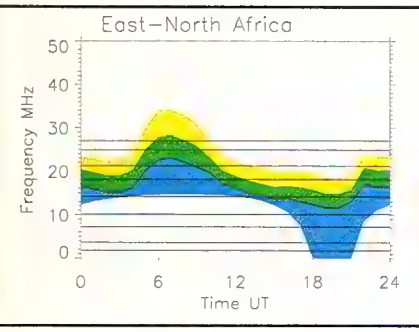
ALF Absorption Limiting Frequency. Lower limit of the usable band.

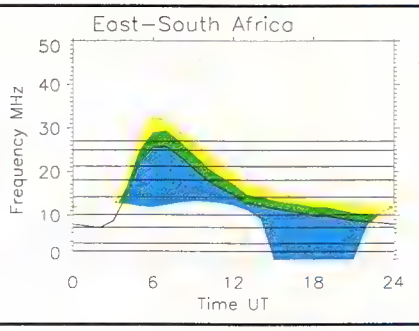


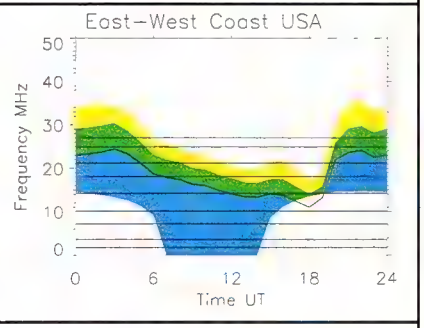


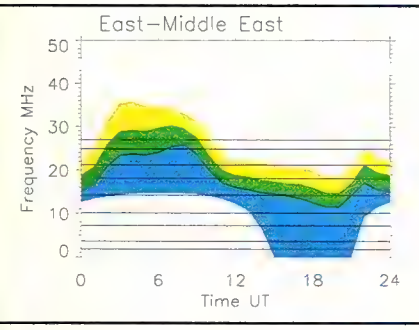


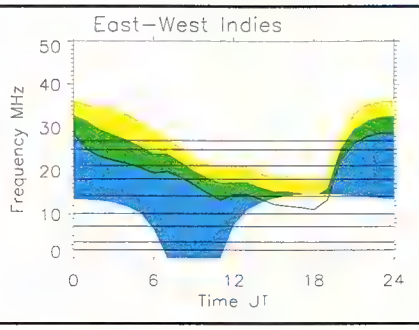


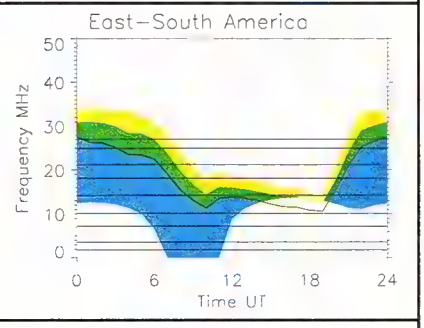


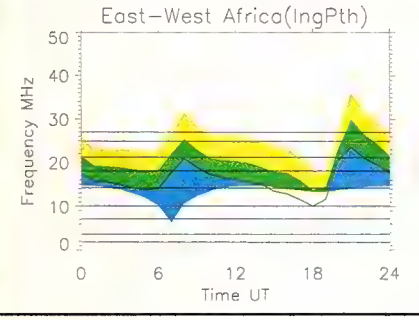


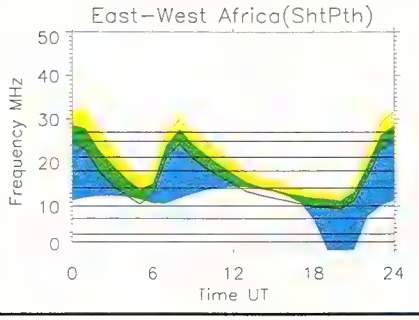


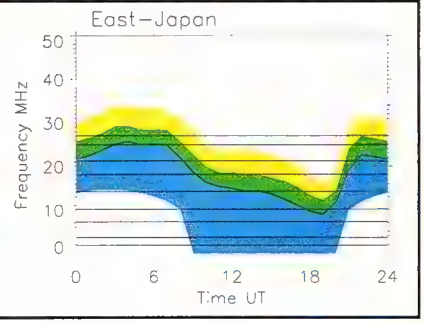












...CLASSIFIEDS...CLASSIFIEDS...CLASSIFIEDS...

ADVERTISERS PLEASE NOTE All classified advertising copy is typed in by a non-amateur typist who, reasonably enough, cannot decode illegible writing. In short, she types what she sees, and if your writing is poor you can expect either crucial errors, or the non-appearance of the advert. PLEASE ENSURE THAT YOUR CLASSIFIED IS LEGIBLE. ALTHOUGH YOU KNOW WHAT YOU'RE ADVERTISING, A TYPIST DOESN'T! In the case of email, your advert must be written in plain text with upper/lower case, hopefully with some punctuation and correct spelling, and marked as to appear under VK1, VK2 etc. "VK3" at the start of your text is fine, followed by "Wanted:" or "For Sale", etc. We will not accept "styled" email, nor "attachments" – just plain text please.

CAVEAT EMPTOR — BUYER BEWARE

*The acceptance of classified advertisements in the **Radio and Communications** classified advertising section does not warrant in any way that the goods offered are available, free of any encumbrance, in working order or otherwise satisfactory. **Radio and Communications** cannot accept any responsibility for goods advertised in the classified pages and no correspondence will be entered into regarding such goods.*

VK 1

* **Icom IC-728** 100 Watt HF Transceiver VGC $440. Tektronix 7704A Oscilloscope 250 MHz. VGC. $360. VK1VP. Ph. (02) 6249 6348.

VK 2

* **Kenwood TS-50S.** $950. Kenwood TS-680S, $600. Kenwood SP-430, $60. Icom IC-281H, $225. All working, manuals included. Bruce VK2 ZNB. Mob. 0418 684 701.
* **Icom IC-R9000.** Icom IC-R8500 communications receivers and manuals in excellent condition. Deceased estate. Best offers. Ph. (02) 4951 8773 or email johngs@fastlink.com.au.
* **New/old stock.** 8040 control head. Upgrades 8030 radios, complete kit includes software and instructions, $290. New 3ELL HF 27 mHz Yagi. Mic, mob. 0438 905 284.
* **Yaesu FT-712RH** UHF radio VGC, $360 ono. KPC-3 TNC, $60 ono GC. Kerry VK2AYY, mob. 0401 109 990.
* **Wanted:** FM unit 100 card to fit Yaesu FRG 100 communications receiver. Will pay all costs. John (02) 6886 5138 or mob. 0429 869 085, leave message.
* **Wanted:** One 40 channel switch for Navaho base with 558 PLL chip. Phone Derrick, (02) 6765 9163.
* **Ten-Tec 6** mtrs transverter – 10 watts out. Brand new in mint condition, only used once, $300. Mirel, VK2BOD, (02) 4333 1823.
* **Moon Raker 4** element 10/11 mtr vert/horizontal beam VGC with assembly instructions, $200. Kenpro 400rc rotator, $200. Kenwood 751 all mode 2m radio, $360. Philips FM 92 on 70 cms, $160 – all in VGC. Mark Wylie VK2HMW/4 (07) 4037 0937, email marksplace@ledanet.com.au.
* **Signal generator** RF SG402, audio generator AG202A, oscilloscope CO1303A, Trio Kenwood equipment, $185 the lot. Helray pep meter, $40. G. Anderson, (02) 4973 3928.
* **For sale:** Uniden 9000XLT scanner as new is box, used once. $330 Mike VK2ASR 02-4472-9338.
* **For sale:** YAESU FT-1000MP, very sparingly used, as new and in top condition. $2850 ono. Raj 02)9211 2824 or email: vk2ipd@hotmail.com for more details
* **Philips FM900** Selcall Unit Type 1. $12. 11 amp Tait Power Supply. Needs minor parts. $35. New 3-ELL HF Yagi Beam. $75. Sawtron 999. $340. Steven. (04) 3802 1466.
* **Yaesu FT890R** HF Transceiver. All bands and all modes. Last of Yaesu's best used receivers only. VGC. $900. Icom IC-T8A Tri-band hand held Transceiver 6m-2m-70cm accessories soft case spk/mic charger AA battery case. VGC. $350. Chris VK2YMW QTRH (02) 9487 2764.
* **IC-257A** All mode Transceiver Boxed with accessories never used. Excellent condition. $875. Models A148-10S and A50-3S Antennas by Cushcraft unopened boxes. $195. each. Model MFJ-921 VHF Dual Band Tuner Excellent Condition - again never used. $85. ED-52C Multi Band Wire Antenna never used. $139. ono. QTHR (AH) Steve (02) 9876 8264.

VK 3

* **Icom IC-725** HF transceiver with auto antenna tuner desk mic all cables and manuals. GC. $700. Icom-27IH VHF all mode transceiver with hand mic and manual. GC. $800. Gary VX3XGL. (03) 9741 9942.
* **Lowe HF-225** communications receiver with keypad, $675. Realistic PRO-2035 scanning receiver, $385. AOR 8000 wide range receiver hand held, $545. Welz WS-1000 scanner, $400. Lino, mob. 0409 420 900.
* **Base Antenna** for CB. Alpha 700 1/4 wave, 9ft new design. Never used, complete, $55. (03 9471 4362 or mob. 0411 055 012.
* **Icom 720A** transceiver, 100 watt, GC with owner's manual, mic and manual tuner, details for packet radio mods. Offer. Peter VK3DGF, mob. 0417 527 214.
* **Wanted** Cobra base 139XLR or 142 and President Maddison base. Ph. (03) 9471 4362 or mob. 0411 055 012.
* **Wanted:** General Electric 5825B AM/SSB twin board CB radios in non working condition. Any complete sets or parts! General offers. (03) 9383 7798. Mob. 0408 531 745. Email: ppapadimitriou@telstra.com.
* **Yaesu** FL 2100Z, works well, $375. Yaesu FT 902D, EC. $375. Yaesu SP901 speaker, $35. Ron, VK3OM (03) 5944 3019
* **Wanted:** Diawa MR-750 Rotator motor/motors in working condition. Bill, VK3DOU, email: jwccomm@bigpond.com. BH, mob. 0409 594 066 or AH, (03) 59 401 263.
* **Nally tower** 2 stage, dismantled, $800 ono. For inspection ring Mark Dunn, mob.0418 315 747.
* **Wanted:** Optional accessories for Kenwood TS790A including UT10 1200 mHz unit, VS2 voice synthesizer and TSU5 programmable tone decoder. Dave, VK3DC, (03) 5483 2220. P.O.Box 978, Echuca, 3564.
* **Silent Keys**. If you are managing a silent key estate, please save the QSL cards for national QSL collection. Contact VK3TL. Ken Matchett. (03) 9728 5350.
* **Yaesu** Transceiver current model FT840 brand new HF Transceiver fitted with FM board. $1000. Dave. VK3DC. Ph. (03) 5483 2220 or Post Office Box 978, Echuca, Vic. 3564.
* **Icom 706** Transceiver. $1250. MFJ 1278 Multi Modem. $250. MFJ 784 DSP Filter. $200. Emtron TE23M Compact Beam. $225. Perfect condition. (03) 9809 0924.
* **Kenwood** 6 Metre All Mode Transceiver Model TS-60S with desk and hand mic. manual and leads. As new condition. $800. Gary. VK3XGL (03) 9741 9942.
* **Coax** 214 50.0 HM. Brand new

Printed at Hannanprint Victoria, 504 Princes Highway Noble Park VIC 3174 Ph 03 9213 3111

* The price set out or referred to herein is a recommended price only and there is no obligation to comply with the recommendation.
All prices referred to in **RADIO and COMMUNICATIONS** are recommended retail prices unless otherwise stated. The publisher's terms and conditions are set out in its current advertising rate cards, which are available on request. They include an exemption clause, a monetary limitation of liability clause, and an indemnity from the advertiser and any advertising agent. Advertisers and agents are advised to read the card before placing any advertisement or series of advertisements.

RADIO and COMMUNICATIONS regrets that it is not possible to verify information other than that conveyed in the editorial content of the publication.
Opinions expressed in the editorial content of this magazine are wholly those of the respective authors and are not necessarily those of the publisher.

Copyright © 2001 Material contained in RADIO and COMMUNICATIONS magazine is protected under the Commonwealth Copyright Act 1968.
No material may be reproduced in part or in whole without written consent from the publisher.

...CLASSIFIEDS...CLASSIFIEDS...CLASSIFIEDS...

super quality double braid silver coated last of roll - 63 metres. Sacrificed for less than half price. $150. Werner Wulf Duo Band Yagi 10-15 mtrs. 6 Elements. EC. $100. Ph. (53) 68 9477

* **Collins** Radio Valves: 51S-1 RX. Complete set 17 new valves. $180. KWM-2/2A Tx./Rx. Complete set 18 new valves with 6146A's $300. With 6146B's $330. Drake MN4 Impedance Matching Network as new with handbook. $150. Wanted: Collins URR390A Rx. In GWO. Ed. (03) 9850 2134.

* For sale: Co-phased 432-20LBX KLM antennas, 20el, 15.3dbd gain each, will separate. Phasing harness free with the pair. Price $120 each. Colin 0359861019 or col@alphalink.com.au.

VK 4

* **Kenwood TS-450S** plus Alinco DM-130 MVZ power supply, VGC, handbooks, cartons, $1100. VK4CJI, (07) 4098 5867.

* **FM 900** transceiver with remote head and mounting plate. Re-channelled for Aust. 2m, 25w. Intended for packet base station but interest waned. VGC, $100. (07) 4039 2417, vk4bl@telstra.easymail.com.au.

* **Wanted**. All band receiver, eg. Yaesu FR-67 for marine use 12V only. mob. 0418 194 633.

* **Wanted:** Antenna tuner. Andrew, mob. 0419 676 059.

Australian Radio DX Club Inc

The premier club in Australia, since 1965, for utility (including military and marine), shortwave, broadcast band listeners. Contact John Wright, 4/33 Kerrie Crescent, Peakhurst 2210, NSW or by 'phone (02) 9533 6261. 12 month membership within Australia, for hard copy delivery $37 and for email PDF format version only $22, GST included.

A free sample copy will be sent on request.

Other benefits of membership apply.

Reg A0011728G.

VK 5

* **Wanted:** Battery charger for Motorola HT-220 handheld. Hank, VK5JAZ, mob. 0403 285 940 or vk5jaz@hotmail.com.

VK 6

* **Intech** 10m transceiver, $200. Dragon SS485+ 10m transceiver, $280. Connex TX200 amp, new, $200. Oskerblock swr 200, $90, original box, manuals, etc. Vaso VK6VAS (08) 9964 2385.

* **Icom IC-7100** ex. Kenwood TS811 70cm all mode base. EC. $500. PRM8030, $400. Darrell Church. Ph/fax (08) 9772 4443, mob. 0429 389 259.

* **For Sale:** Icom IC-736 HF+6m allmode. Inbuilt ATU and PSU, EC $1500. Icom IC-821H 2m + 70 cm allmode satellite rig with Icom SM-8 desk microphone. EC $1500. Kenwood TS-711A 2m allmode, EC $600. All ono. Rick VK6XLR (08) 9921 7073 or vk6xlr@qsl.net

* **For sale:** Kenwood TS660 transciever all mode quad bander $300, also Philips FM92 converted to 2 metres amateur. Geoff VK6AT, 08 95814596 or geofmary@starwon.com.au

VK 7

* **Kenwood** TS690S HF+6M . Comes with MC80 Desk Mic, manual and boxes. Mint Condition. $1550. John. VK7ZZ (03) 6267 4473.

CB / GENERAL

* **For Sale:** Philips VCO blocks (2) Band 4/wl. Unused Philips spare parts, $65. Includes registered mail. More info email alwin@uq.net.au or mob. 0418 745 592

* **Yaesu FRG 7700**, FRA 7700 short wave receiver. Memory boards fitted, manual, good working order, $300 ono plus freight if applicable. 100m RG213 unused on reel, $250. N type coax connectors (6), $40. Includes registered mail. More info email alwin@uq.net.au or call mob. 0418 745 592.

* **Sawtron KG107D** UHF radio 4 banks, mint condition, $490. Sawtron KG109D handheld UHF 5 watts, $380. Kyodo KG209D handheld UHF needs programming, $135. Steven, mob. 0438 021 466.

* **IC R8500**- comms receiver, 18 months old, VGC, $2000 ono. Rob Duncan, email duncr@ncable.com.au.

* **For sale:** AOR 8200 h/held scanner $850 ono, c/w all acc in box, EC. Paul 08 85 565 058. general

* **Wanted:** Philips PRM8020/30 UHF TmTu band radio for RFS station, in good condition, reasonable price paid, also details of UHF CB loop Yagis. Ross 0428844170

* **Wanted:** Johnson Viking 4740 LED model, also 40 channel clicker to suit a 352D. D Sammut PH 9877.0675

* **CB Radio Shack** cleanout: New transistor for PLL-02A circuits, Antennas, RF adaptors, much more. Send SASE for list and prices. P.O. Box 76, Peterborough, SA, 5422. (08) 8651 2398

Want to write about your hobby?

Email lenshaw@eck.net.au

FOR SALE:

Major clear-out of equipment, some new, some mint cond, all GC, all goers. New = never used, mint/as new = maybe used one or twice for review purposes, EC= used, unmarked, quality performance, GC= quality performance, used, may have scratch, dent or whatever. All prices are plus postage/transport.

TRANSCEIVERS & ACCESSORIES:

Kenwood SP20 filtered speaker,EC - $195
Kenwood PS50 power supply, EC - $225
Icom IC-229H 2m transceiver, as new, manual - offer

CW/DIGITAL:

Kent Key - mint - $125
MFJ Grand Master Memory Keyer, mint, manual - $75
MFJ 959 Receiver Tuner/Preamp, mint - offer

ANTENNAS, etc:

* HyGain Long John - mono - 15m, 5el on 7.9m boom, 12dB gain, 34dB front back ratio - superb antenna, manual - $425

Mobile One:
M1-20, 20m mobile whip, as new, tunable - $30
M1-80, 80m mobile whip, as new, tunable - $40
M476, colinear UHF 6dB, 450-500MHz - new - offer
CD470, ground independent 477MHz, inc. coax - new - offer
D4207, 5/8 144MHz - new - $15
DX1605SH, 26.5-29MHz, mobile whip - new - $45
DX5, heavy duty 27MHz - as new - $95

Terlin (Outbacker):
(1) Taps: 2.3,3.560,3.580,3.615,4.055,5.410,6.840,21.175, 28.460,28,540, GC - $225 (save $100 on new cost)
(2) Taps: 2.360,3.540,4,010,4.880,5.300,7.307,7.475,21.160,27,055, 27.355, GC - $225 (save $100 on new cost)
(3) Taps: 80m, 4.077,6.218,40m,8.198,8.707,12.308,20m, 16,423, as new - $225 (save $100 on new cost)
Benelec: 0276: 24el discone 60-1,000 MHz - new - $150
ZCG: Ground independent, 27MHz - new - $75

All of the above are realistically priced for quick sale, first in best dressed. Len Shaw VK3ALS, ex-editor CB Action, ARA, editor R&C – email preferred: lenshaw@eck.net.au or (03) 57 992 943, fax (03) 57992979.

What's it worth today?

Yaesu's FT-747 basic HF transceiver

By **Neil Duncan** VK3ND

There are a number of interesting things about the Yaesu FT-747 HF transceiver. Firstly, it was created to meet a need, namely that of providing an HF transceiver with a general coverage receiver to the amateur radio community at an absolutely rock bottom cost.

To that end, the rig was an outstanding success in its time. It is also one of the most simple of all HF multi mode rigs to operate.

The FT-747 not only enjoyed a long production run, but it was also sold by the now defunct Heathkit company under a different model number, and yes, they did it as a partial kit. The physical construction techniques used by the Yaesu designers really indicates shows how some of the economies were achieved. A large main circuit board was mounted near the floor of a case made essentially of a metallised plastic material.

Supplementary circuit boards were mounted elsewhere inside. On one hand, this does not result in ruggedness 'as tough as they come', but on the other hand, it isn't too bad.

A WHISKER UNDER 30 MHZ

The FT-747 covers the 160-10 metre amateur bands on transmit plus and its receiver runs from 100kHz to a whisker under 30 MHz.

The 'as standard' modes are USB/LSB/CW/AM although FM was an optional extra.

Check whether it is present when you go to buy one.

The transmitter produces 100 watts on all of the modes except AM where 25 watts of carrier is produced.

The bright amber LCD display with backlighting makes for easy viewing in all situations.

YOU EVENTUALLY GET USED TO IT

Tuning the FT-747 VFO knob for the first time results in an eyebrow -raise. The main knob goes chunk-chunk as you turn it. This 'detented' effect is provided to guard against such things as those inevitable shocks you get when you drive over a speed humps at high speed, or thump the bench with your fist when someone says something you don't like. You eventually get used to it - well sort of.

20 MEMORY CHANNELS

The rather limited offering of 20 memory channels is par for the course in rigs of this era, and the front panel really only sports three knobs. But they are concentric and there are heaps of other buttons to press if you are bored as well. An RIT knob (receive only) a narrow filter switch, attenuator, a rather noise blanker, mode, VFO/memory transfers, VFO/MR Button, VFO split button priority memory button, fast tune button band-select button, AF and squelch knobs microphone gain and drive power level knobs complete the lineup. The FT-747 offers dual VFOs and has a CAT (Computer Control) socket on the rear panel.

OFTEN EVENTUALLY WORKED QUITE WELL

Possible modifications to the FT-747 include a way to remove the front panel, to run an extension lead to the rig from one end of it and to put the front panel at the other end. The resulting remote mount kit while sometimes physically clumsy and unstable often eventually worked quite well. The rig weighs a mere 3.3 kg making it highly suitable for mobile or portable use. The dimensions are 238 x 93 x 238 mm WHD and the current consumption at a nominal 13.5 VDC is 19 amps at full transmit power.

BELOW $750

A price below $750 for a good unit makes sense, while an ex-mobile or one to which that that the remote mounting kit had once been applied, might be worth below $400, depending on condition.

GOOD RIG

Yep, a lively receiver, very good transmit audio, good stability, and reliable and clear transmissions are offered. Oh and yes, it is, a really good starting-out radio, too

YAESU'S DONE IT AGAIN

YAESU

FT-817 HF/6m/2m/70cm Transportable

The world's first self-contained complete battery powered multimode transceiver covering all the Amateur bands from 160m to 70cm. Provides up to 5W PEP output, with SSB, CW, FM, and AM modes, plus reception of the 100kHz-56MHz, 76-108MHz (wideband FM only), 108-154MHz, and 420-470MHz ranges. Operates from 8 x 'AA' size batteries (not supplied) and Alkaline or NiCad batteries may be used. An external 13.8V DC power source can be easily connected to the transceiver, and a Menu function will allow charging of the optional FNB-72 NiCad pack from the 13.8V DC source. Includes 'big rig' features such as IF Shift for reduced adjacent channel interference, IPO to allow by-passing of the RF pre-amp on HF/6m for improved strong signal performance, an IF Noise Blanker for reduction of impulse noise, and a front-end Attenuator for more pleasant reception of extremely strong signals. Includes 2 antenna sockets - a top panel BNC socket plus a rear panel SO-239 socket and the menu system allows you to define which socket will be used on the HF, 6m, 2m, and 70cm bands. Includes: 200 memory channels with Alpha tagging, VFO and Memory scanning, Dual Watch and Priority Channel operation, as well as Smart Search. CTCSS and DCS encode/decode circuitry is built-in as standard. Supports 1200 and 9600 baud VHF/UHF Packet operation, and the Menu system allows custom setups for RTTY and PSK31 (USB & LSB), as well as two User Defined models (eg. for SSTV use). Supplied with the following accessories: MH-31 handheld microphone, FBA-28 internal battery holder, YHA-63 Whip antenna for 6m/2m/70cm operation, E-DC-6 DC cable, and a shoulder strap.

D 3680

$1495

2 Year Warranty

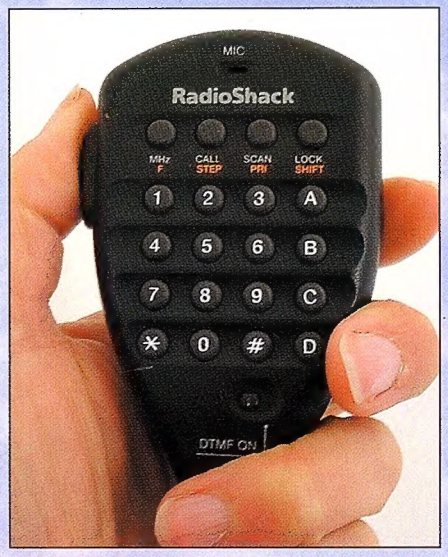
DICK SMITH ELECTRONICS

That's where you go!

All Yaesu products listed are priced in Australian dollars, and are not stocked in Dick Smith Electronics stores outside Australia. Check our web site www.dse.com.au for further ordering information. Offers expire 30/9/2001

SYNCRO

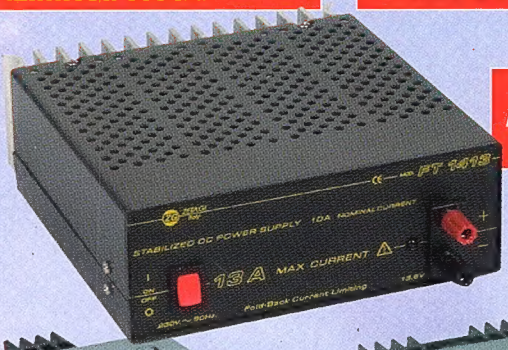
AUSTRALIA COMMUNICATIONS SPECIALISTS



NEW DTMF Microphone
Electrite up & down counter plus many more features. $75

D10 Amp Power Supply with amp and vault meter $128
(Limited stock)

HP12S - Zetagi 12Amp power supply with large Volt & Amp meters $128



FT1413 - Zetagi 13 Amp surge toroidal transformer $120

D3/5 power supply - 3Amp continious 5 Amp surge $49.50
AUGUST SPECIAL ONLY

D6/8 - 6 Amp continious 8 Amp surge $98

D5/7 - 5 Amp continious 7 Amp surge $95

CIRCUITS GALORE PARTS

5089 DTMF encoder	$3.00
92870 DTMF decoder	$5.00
3.579MHz crystal	$2.00
40106 Hex Smitt Inverter	$1.50
4543 BCD to 7 segment driver	$1.50
4514 4 to 16 line decoder	$2.50
4093 Quad nand gate	$1.50
4017 Dec. counter	$1.50
4008 Adder	$2.00
145106 PLL	$7.50
10551 Divider	$6.50
PCB Board for 4 digit encoder	$10.00

D22- 22 Amp power supply with Amp & Volt meters, over load protection, over voltage protection (automatic shut off) $225 August ONLY

HP147 - Zetagi 5 Amp continious power supply $100
Limited stock

197 FALLS ROAD LESMURDIE WESTERN AUSTRALIA 6076
Tel: +61 (08) 9291 9982 Fax: +61 (08) 9291 9984 Mobile: +61 0404 091 123
Email: hahn@syncroelec.com.au Website: http://www.syncroelec.com.au